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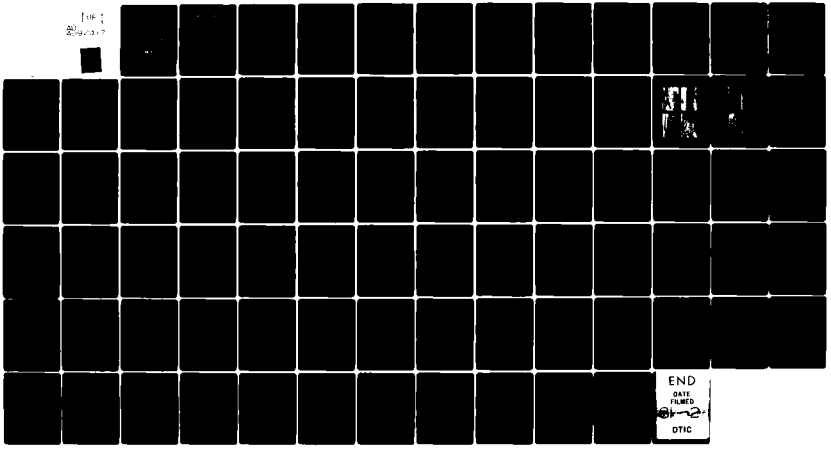

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Coso Monitoring Program

February 1978 – December 1979

by
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JULY 1980

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FOREWORD

This report presents the status of the Coso Monitoring Program conducted between February 1978 and December 1979 by the Naval Weapons Center (NWC), China Lake, California. The investigation, funded under Task Z0840-SL, is being conducted to provide background information on Coso hydrology and rainfall in the area of the Coso Hot Springs.

This report was reviewed for technical accuracy by Carl F. Austin, Bruce L. Jackson, and James A. Whelan.

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(U) The Coso Monitoring Program is a continuing effort in support of the geothermal development of Coso, which is located within the boundaries of the Naval Weapons Center. Data are presented on the monitoring of steam flows, water levels in ponds and wells, water chemistry, temperature logs of shallow wells, and rainfall at the Coso Resort, A weekly photographic study of the mud pots is described showing the variation of fluid levels in the mud pots in the wet and dry seasons.

CONTENTS

Tables:

INTRODUCTION

The objective of the Coso Monitoring Program is to provide background data on the wells, steam flows, and ponds at Coso Hot Springs in order to document any significant changes in fluid levels and flows that may result from the development of this geothermal resource.

Data collected during the period covered in this report (February 1978 through December 1979) were obtained as a result of (1) steam flow monitoring at two sites, (2) a mud pot photographic study, (3) water level monitoring of various sites, (4) rainfall measurements, and (5) water analysis and temperature logs of three wells.

A monitoring plan was developed in the summer of 1979 by Dr. James Whelan of the Geothermal Utilization Division at the Naval Weapons Center (NWC). This plan was intended to supplement data already being obtained from existing sites and to provide adequate monitoring of the Coso Fault from Schober's Resort on the north to the 2-inch steam well on the south end of the fault. The monitoring program, outlined fully in this report, also recommended the drilling of additional wells; however, these new wells have not yet been funded. Data obtained as a result of this plan are included in this report.

BACKGROUND

During calendar year 1978 and the first few months of 1979, steam flow data were being obtained on a regular basis at two sites: Devil's Kitchen and Coso Well 1. In addition, the water level at Coso Well 1 was being monitored on a regular basis. Water sampling and temperature logging also provided data, as did a photographic study of the Coso mud pots.

At that time (July 1979), an expanded plan for monitoring surface and shallow subsurface geothermal manifestations along the Coso Fault was published.[1] This plan strongly recommended that the baseline data be expanded and refined. Specifically, the plan included the following recommendations: (1) the monitoring should be expanded to cover the entire length of the fault; (2) climatic data should be obtained in the vicinity of the alluvial fan about the Coso Hot Springs Resort; and

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[1] Naval Weapons Center. *Plan for Monitoring Surface and Shallow Sub-surface Geothermal Manifestations Along the Coso Fault*, by Dr. J. A. Whelan. China Lake, CA, NWC, 10 July 1979. (NWC Memo 26601/JAW:kas, publication UNCLASSIFIED.)

(3) more quantitative data on the seasonal variation of the shallow subsurface water in the vicinity of the mud pots should be obtained.

Specific items recommended in the plan included:

1. A shallow steam well should be constructed at the Wheeler Prospect, probably by drive pipe, so that steam flow could be measured by anemometer (weekly when charts are changed).

2. The steaming well on the hill southwest of the Coso Resort should be rehabilitated so that a new standpipe could be installed. Steam flow could be measured weekly by an orifice/manometer or continuously by a recording meter.

3. The water level in Well 4P-1 (the fresh water well) should be determined quarterly.

4. The contents of Well 4K-1 (possibly boiling mud) should be determined quarterly.

5. A good method of quantitatively determining the water level at the mud pots, would be to place an unobtrusive staff gauge in the cistern-like structure there and read the level weekly.

6. The main well at the Coso Resort should be rehabilitated for monitoring. First, permission to use this National Historic Site was needed; then a detailed plan was to be worked out, along with a determination of available funding.

7. A water well in the valley east of Coso Hot Springs would be desirable.

8. The manifold at the Coso Well 1 corrosion array should be modified so that (a) various combinations of wells can be flowed through the meter, and (b) vertical access to each well can be obtained. This would take some careful planning and execution.

9. The flow from the stove pipe well should be monitored weekly with an orifice or anemometer-type device.

10. One well at Schober's Resort should be rehabilitated and monitored weekly.

11. A suitable site for monitoring at the Nicol Prospect was not evident.

Figure 1 shows the location of the monitoring sites as specified in the monitoring plan. At present, five of these sites are being monitored with continuous recording meters, and two sites are being periodically

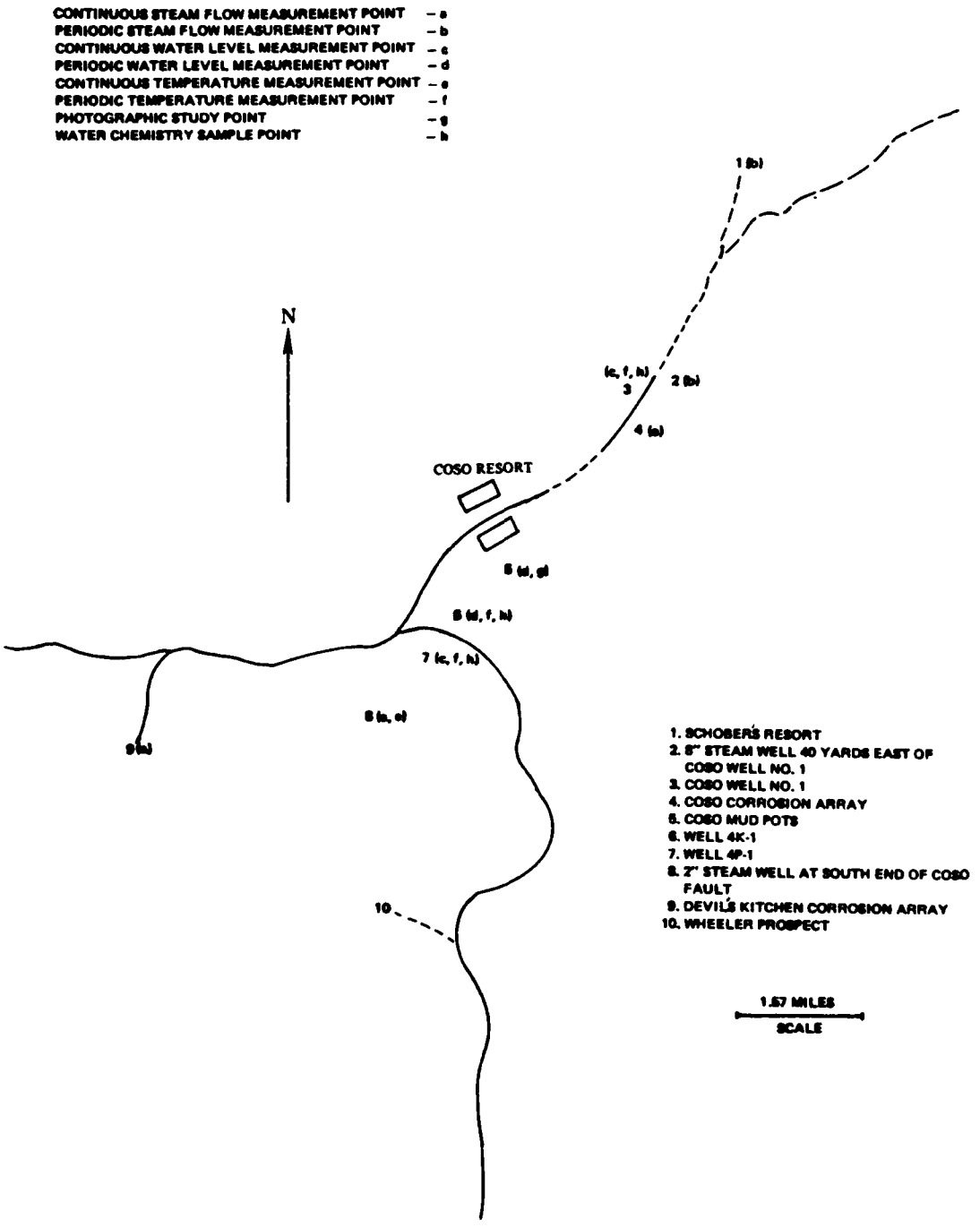


FIGURE 1. Monitoring Sites.

monitored and manually recorded. The proposed well east of Coso Resort has not yet been scheduled for drilling, nor has a monitoring site been developed at the Wheeler Prospect.

STEAM FLOW MONITORING

DEVIL'S KITCHEN CORROSION ARRAY

The corrosion array in Devil's Kitchen is supplied from a shallow auger hole fitted with a 55-gallon drum open to the steam source on the bottom and covered with soil and cement on the top end. The top of the drum is fitted with a 4-inch pipe which supplies the steam to the array. Steam flow through the pipe and array is metered through a calibrated orifice plate and recorded on a Barton 202A 25-inch W C 7-day clock-operated differential pressure recorder. Diameter of the orifice plate is 1.25 inches.

Daily chart readings of the Devil's Kitchen steam flow covering the period from 23 February 1978, through 31 December 1979, are given in Appendix A and illustrated in Figures 2 and 3. The particular flows selected are the flows at 1200 each day and the high and low reading each day. Steam flow in pounds per hour is obtained by multiplying the chart reading by the flow meter calibration factor 33 for this meter and orifice combination; this calculation results in a nominal mass flow of 300 lb/hr through the array.

The factor most affecting the quantity of steam flowing through the array is the amount of precipitation received in the immediate area within a given period. The flow is therefore slightly lower during the hot, dry seasons of the year than during periods of light and medium rainfall. However, during a rainfall and for a short period of time thereafter, the flow is reduced for two reasons: (1) the flowlines are cooled and act as a condenser within the lines; and (2) the ground is initially quenched, and this reduces the quantity of steam flowing through the rock and soil and into the collector unit. Reduction of differential pressure ($-\Delta P$) across the orifice meter due to rainfall on the flowlines is shown in Figure 4.

Periodic daily fluctuations of the steam flow are due to the changes in ambient temperature. Because of the low temperature of the steam (209°F) and the uninsulated flowlines, a slightly higher fraction of the flow is condensed with a slight drop in ambient temperature, and the resulting flow across the orifice plate is therefore lower. The condensed fluid flows by gravity back into the source.

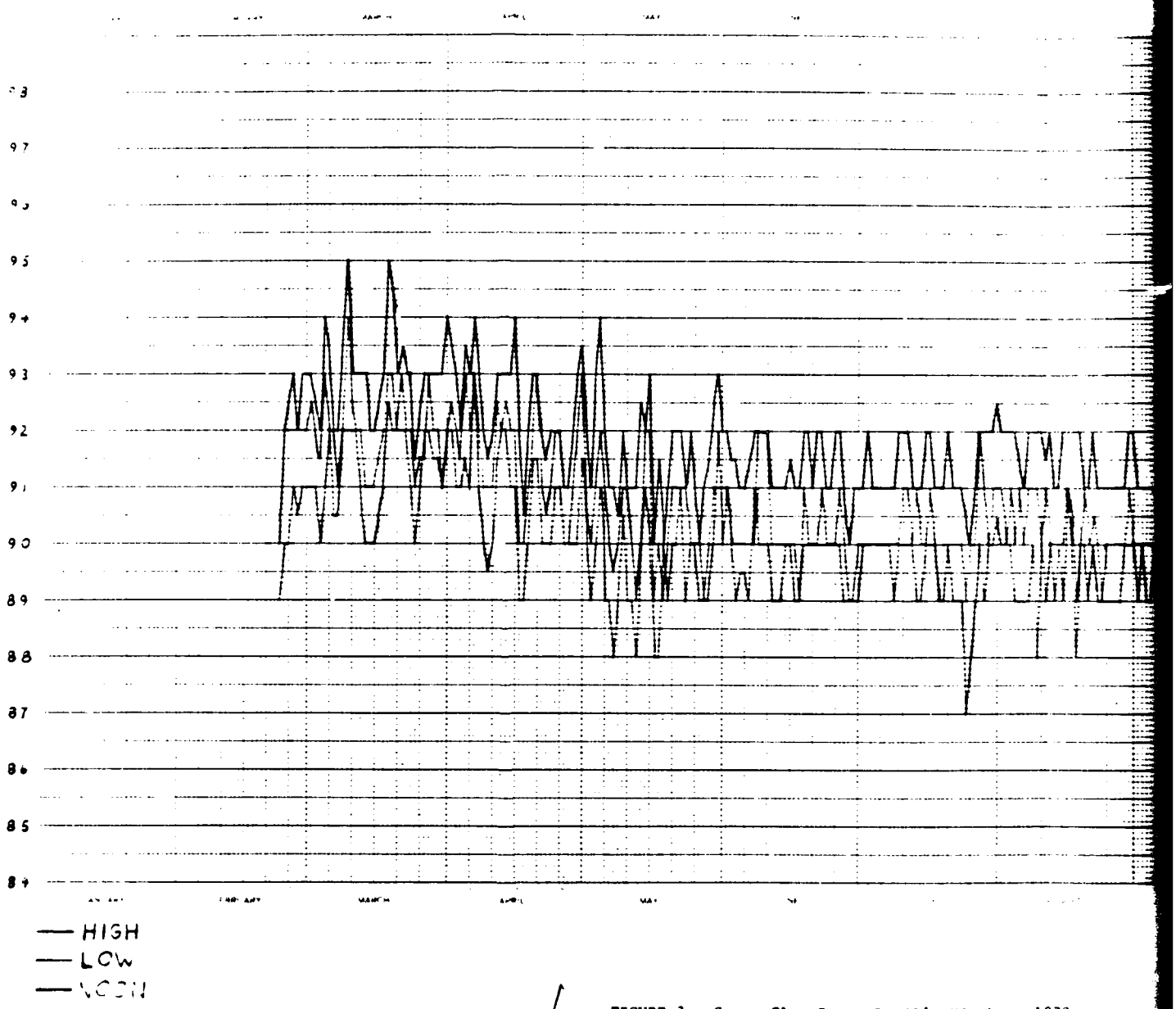
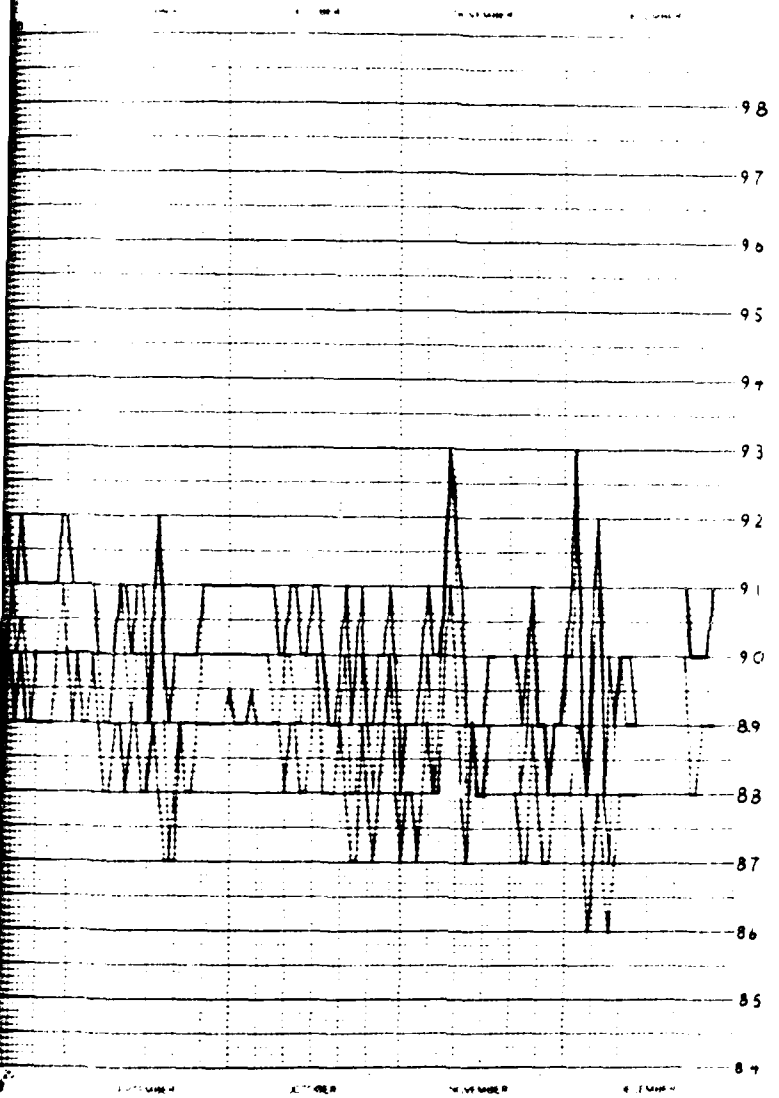


FIGURE 2. Steam Flow Rate, Devil's Kitchen, 1979.

-1978



THE NUMBERS PLOTTED ARE DIRECT READINGS FROM A BARTON FLOW METER. TO OBTAIN THE ACTUAL FLOW RATE (lbm/hr.) MULTIPLY BY 33.

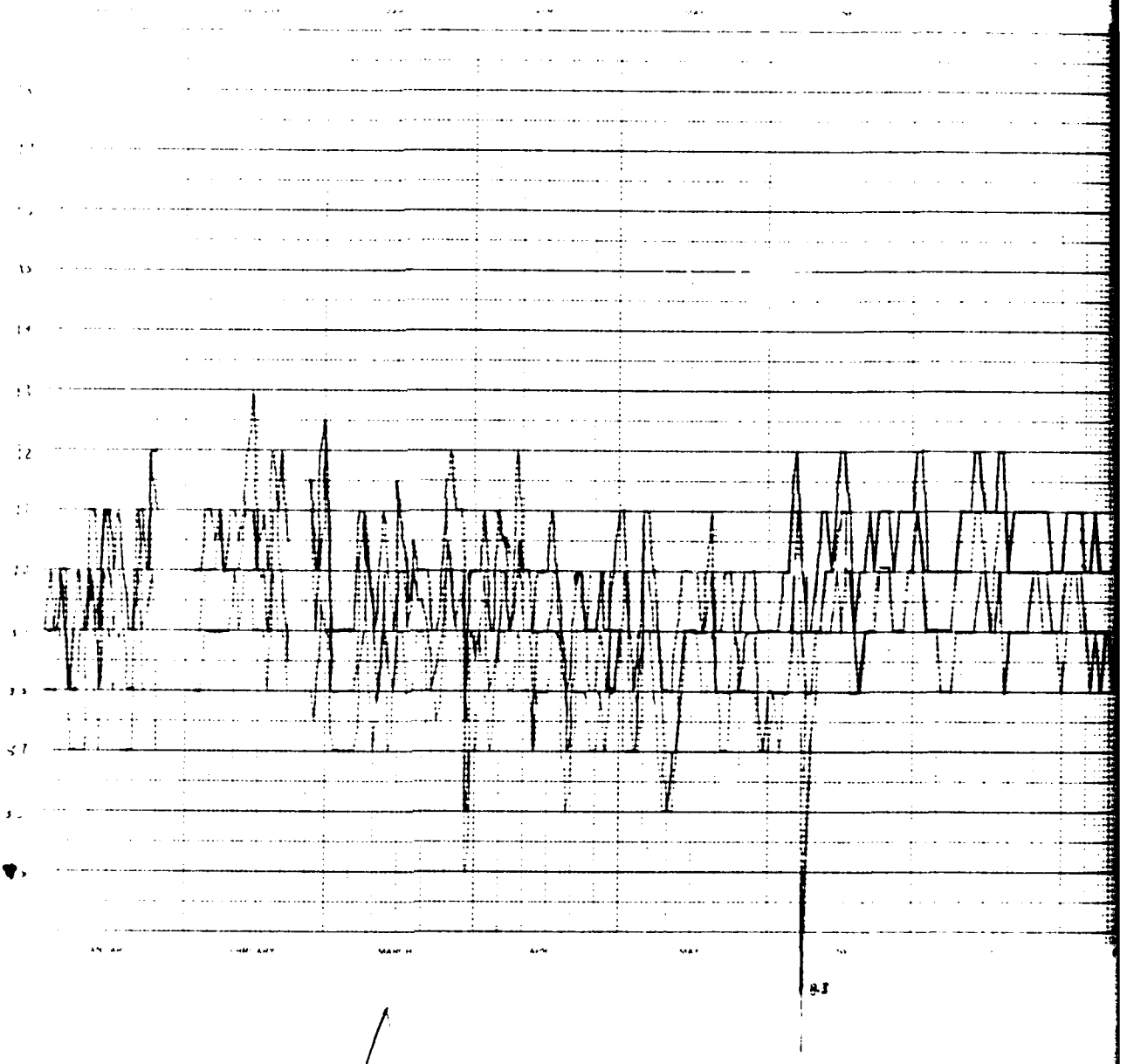
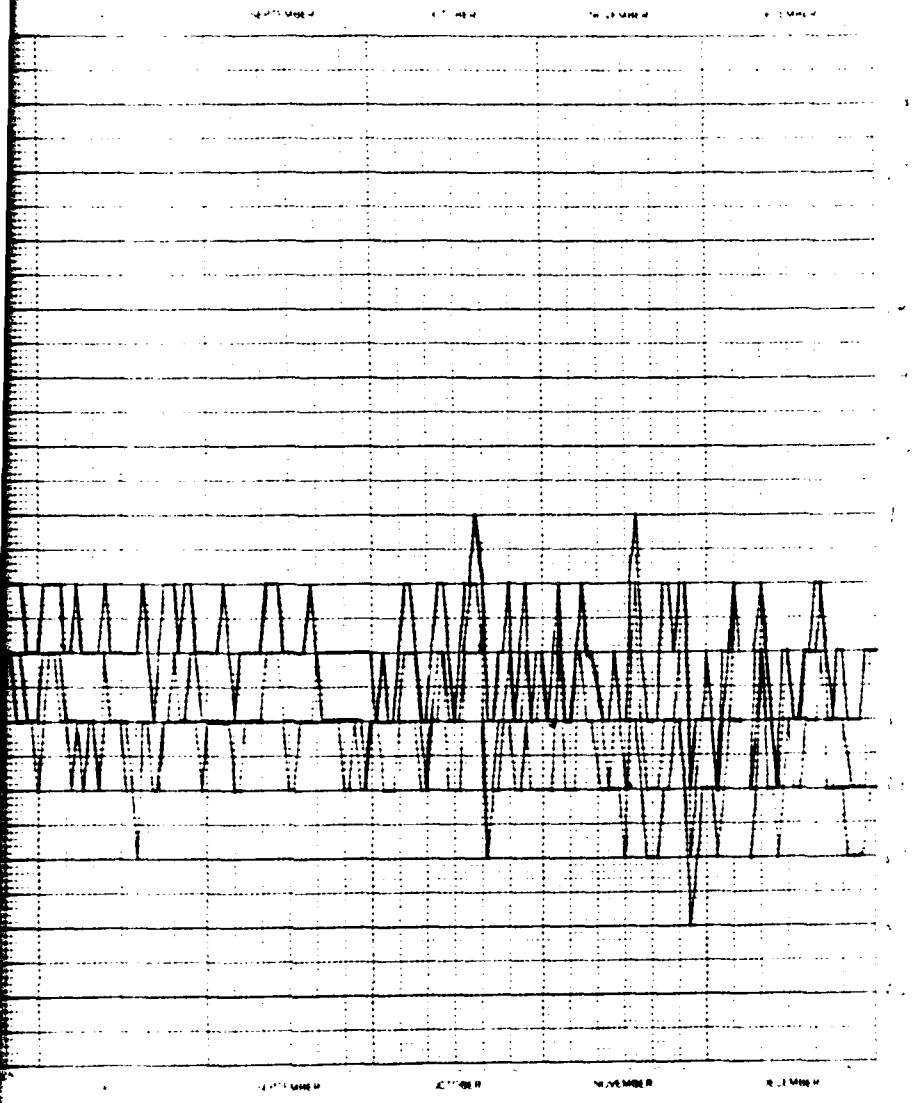


FIGURE 3. Devil's Kitchen, 1979.



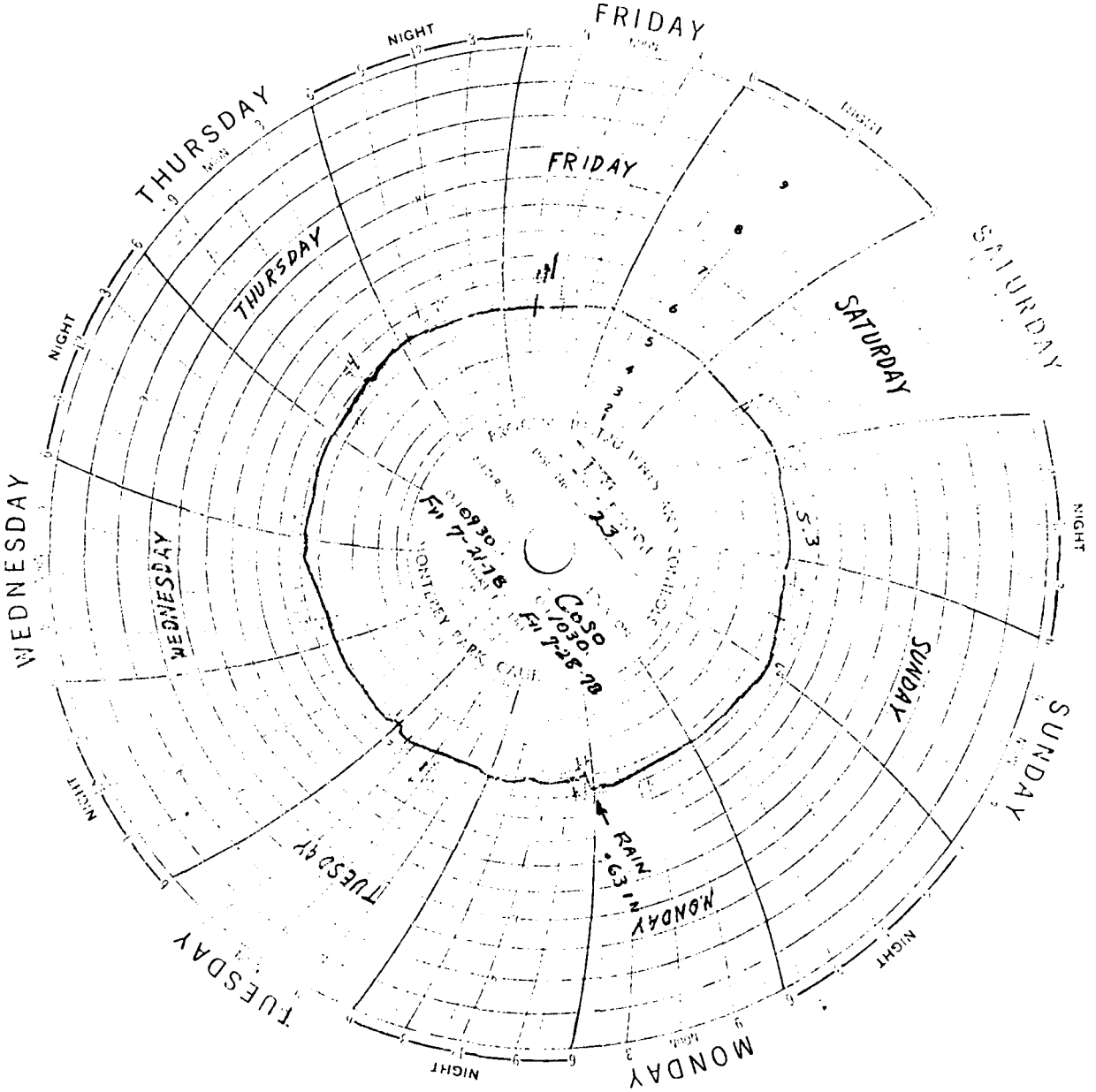


FIGURE 4. Reduction of Differential Pressure Due to Rainfall.

The steam flow through the Devil's Kitchen array is very nearly constant, with only a 26.4-lb/hr variation in flow throughout the entire reporting period. The tabular raw data, presented in Table A-1 in Appendix A, are summarized in Table 1.

These data will be useful in determining the significance of any changes in flow which occur as a result of developing the geothermal resource.

TABLE 1. Devil's Kitchen Steam Flow Data.

Element	Year	Chart readings		
		High	Low	Noon
Mean	1978	9.13	8.94	9.03
Standard deviation, σ	1978	0.13	0.13	0.13
Mean	1979	9.01	8.84	8.92
σ	1979	0.09	0.09	0.09
Mean	78-79	9.06	8.89	8.97
σ	78-79	0.125	0.12	0.12

COSO RESORT CORROSION ARRAY

The corrosion array in the Coso Resort area is supplied from four shallow steam wells flowing a nominal total mass flow of 600 lb/hr. The flow is metered through a 1.97-inch diameter orifice plate and recorded on a Barton 202A 50-inch W C differential pressure recorder. Daily chart readings of the Coso array steam flows covering the period from 23 February 1978 through 31 December 1979, are given in Appendix A and illustrated in Figures 5 and 6. Steam flow in pounds per hour is obtained by multiplying the chart reading by the flowmeter calibration factor, 120 for this meter and orifice combination.

The steam flow on this array is affected in the same manner as the flow on the Devil's Kitchen array by precipitation and daily temperature fluctuations. Temperature variations produce a greater percentage change in steam flow on this array than in Devil's Kitchen because of the cooling effect of the much longer length of flowlines and the greater exposure to the weather, including the cooling effects of the wind.

In contrast to the low variation in flow through the Devil's Kitchen array, the Coso array experienced a change in flow of 540 lb/hr: the range went from a high of 912 lb/hr on 19 December 1979 to a low of 372 lb/hr on 4 February 1979. Coso had received a snowfall (characterized as very heavy for that area) on 31 January 1979.

STEAM FLOW RATE COSO -

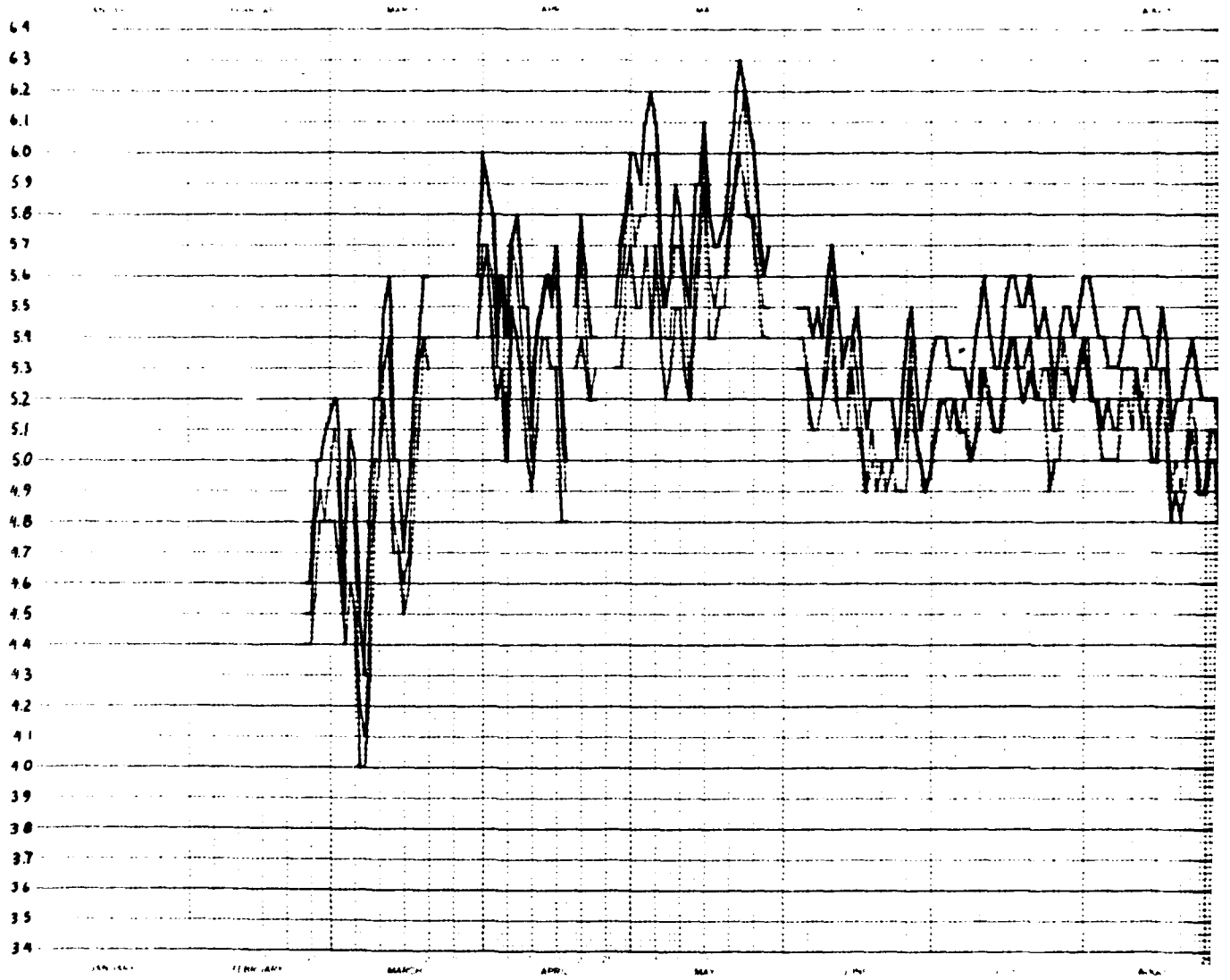
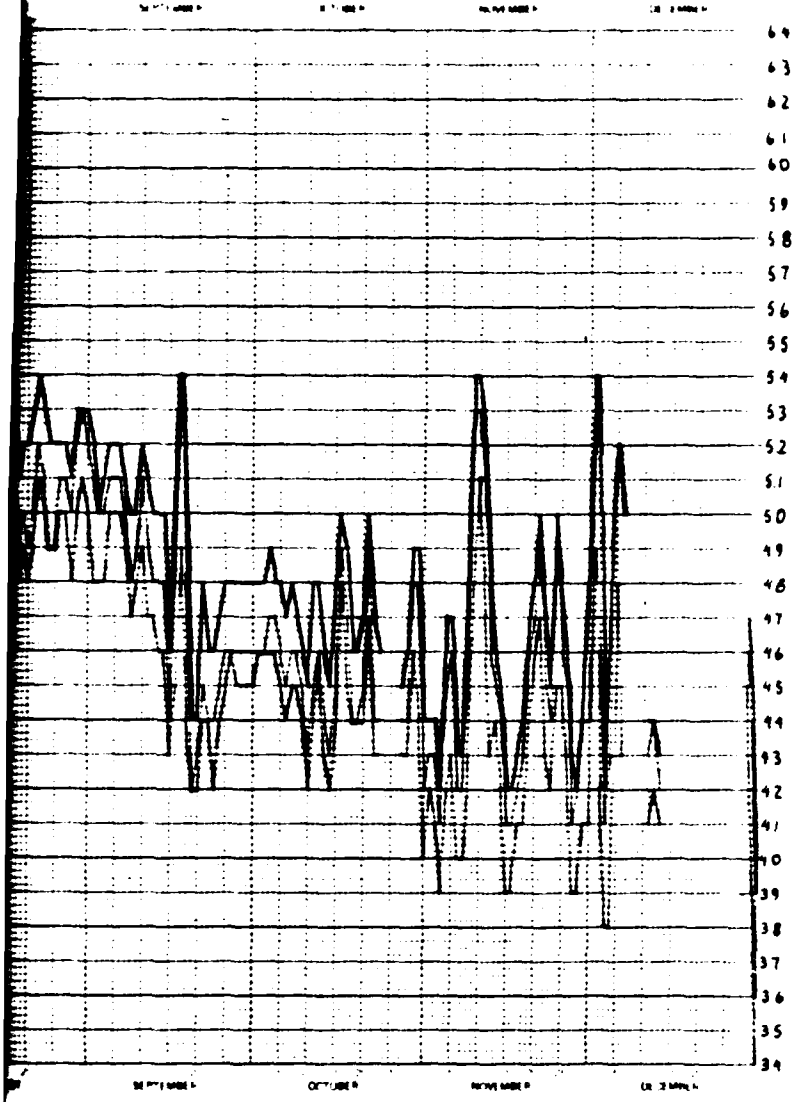


FIGURE 5. Steam Flow Rate, Coso, 1978.

1978



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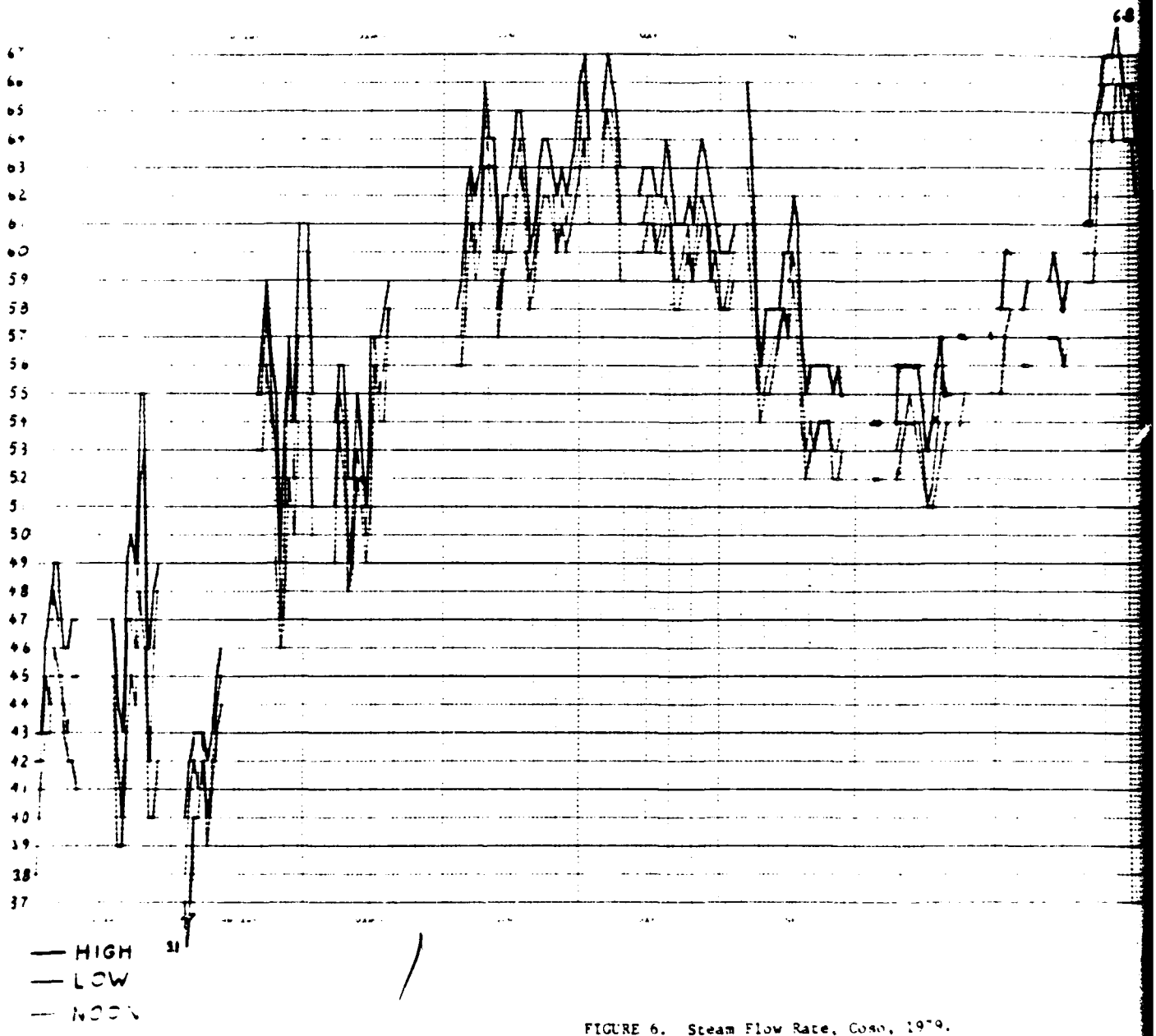
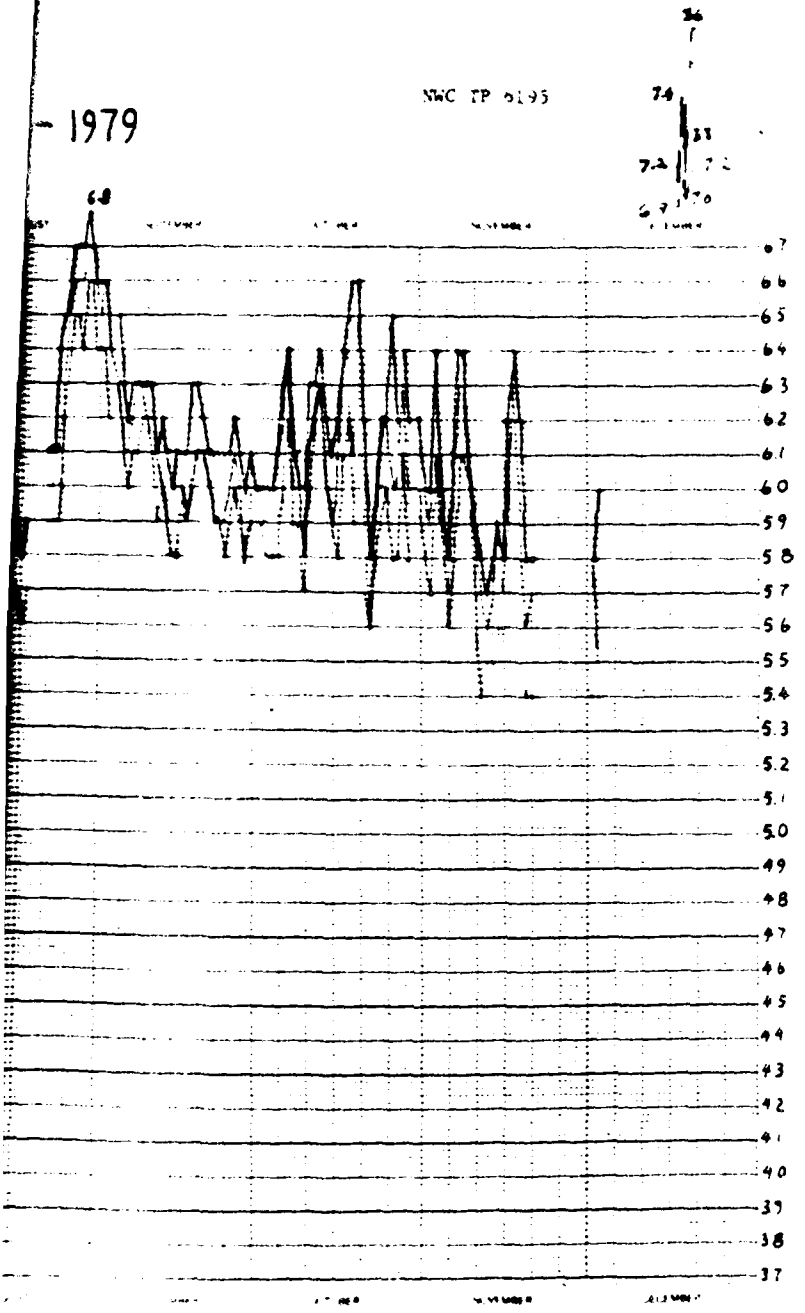


FIGURE 6. Steam Flow Rate, Coso, 1979.

- 1979



THE NUMBERS PLOTTED ARE DIRECT READINGS FROM A BARTON FLOW METER TO OBTAIN THE ACTUAL FLOW RATE (l/m) MULTIPLY BY 120.

Table 2 shows the mean and standard deviation for the Coso corrosion array flows for 1978 and 1979. The tabular data are included as Table A-2 in Appendix A. Holes in the data are due to the malfunctioning of the recorder over that particular time period.

TABLE 2. Coso Corrosion Array Steam Flow Data.

Element	Year	Chart readings		
		High	Low	Noon
Mean	1978	5.18	4.88	4.98
σ	1978	0.47	0.48	0.60
Mean	1979	5.92	5.66	5.80
σ	1979	0.62	0.58	0.75
Mean	78-79	5.51	5.25	5.37
σ	78-79	0.80	0.66	0.79

EIGHT-INCH STOVE PIPE WELL

The 8-inch stove pipe steam well is located approximately 150 feet northeast of the Coso corrosion array. This well was put into condition to monitor by the installation of a shop-fabricated orifice section containing a stainless steel orifice plate and pressure taps suitable for measuring the pressure differential with the manometer. With a 1.70-inch-diameter orifice, the pressure differentials read as follows:

Date	Differential pressure cm H_2O
10-3-79	12.6
11-20-79	10.4
2-15-80	11.0

The flow in pounds per hour is calculated from the following equation:

$$Q = \sqrt{(-\Delta P)},\ \text{cm} \times 75.492$$

$$= 11.33 \times 75.492 = 254\ \text{lb/hr}$$

The number of readings which can be made on a monitoring site using a manual system limits the usefulness of the data from that site. For this reason, it is recommended that a recording orifice meter be installed on this well in the near future.

TWO-INCH STEAM WELL

Initial pressure differential readings on the 2.0-inch well, located at the south end of the Coso Fault, were made using an orifice plate and manometer. Recently, however, a Barton 202A recording flowmeter was installed; this meter records both the temperature and the pressure differential. A typical set of readings over a period of 1 week is shown in Table 3.

TABLE 3. 2.0-Inch Steam Well Temperature and Pressure Readings from Barton Recorder.

Date	Temp, °F		Pressure Differential	
	High	Low	High	Low
1-4-80	202	194	8.70	7.85
5	204	194	8.80	7.82
6	201	185	9.11	8.10
7	189	159	8.62	8.00
8	191	169	8.55	7.95
9	201	192	8.56	7.50
10	201	192	8.83	7.63

The meter constant for this recorder and orifice combination is 15.7; therefore, the flow varied from a high of 143 lb/hr to a low of 117.8 lb/hr over the time interval recorded.

Readings taken previously with the monometer were as follows:

Date	$\sqrt{(-\Delta P)}$, cm H_2O	Q, lb/hr
10-03-79	25.8	99.46
11-20-79	23.6	95.13
12-18-79	28.5	104.54

The orifice diameter for both sets of data is 0.86 inch. It is evident that the recorder provides a much more useful data base of information than does reliance on occasional manual readings.

SCHOBER'S RESORT

A site has been selected for monitoring at Schober's Resort on the north end of the fault but as yet a flowmeter is not available for installation. A ball-type flowmeter was installed at the site but did not have sufficient flow capacity. Possibly an orifice plate for measuring the differential pressure would be the best choice until a recording flowmeter can be purchased.

COSO MUD POT PHOTOGRAPHIC STUDY

A pictorial study of the Coso mud pots by C.F. Austin and E.M. Edwards[2] documents the fluctuation in fluid levels from January 1978 through the present. A considerable variation in the amount of water in the pools is evident in the pictures taken in the winter of 1977/78, which incidently was a very wet year at Coso, compared to the same scenes in the summer some 4 months later. The pots appear nearly dry in photographs taken the last week in June 1978 as the weather turned hot with no rainfall at all that month. Exact correlations of water levels in the mud pots with the amount of rainfall is not possible, as precise data on the levels of water in the mud pots or on the rainfall were not collected at that time.

This study, which involves weekly photographs, provides historical data for comparing fluid levels in the various mud pots at weekly intervals with previous and future levels. Photos of four of the more prominent pots and ponds in both the wet and dry seasons are shown in Figures 7 and 8. The collection of fluid level data on the Coso ponds was initiated in late August 1979, and will provide additional quantitative information to supplement the pictorial study.

WATER LEVEL MONITORING

COSO WELL 1

Water level in Coso Well 1, completed in 1967 to a depth of 374 feet, is being monitored continuously with a float-actuated water level recorder. The recorder is Weather Measure Corporation's Model F553A-5F battery-powered unit with selectable drive speeds. The unit was placed in service in mid-August 1978 and, except for some corrosion problem with the stainless steel drive tape, has performed satisfactorily.

A recently discovered problem with the float and support line, however, has cast doubts on the accuracy of the data. The float, which was fabricated at the Naval Weapons Center, is a 16 1/2-inch-long steel cylinder approximately 2 inches in diameter and 1 1/4 pounds in weight. The problem is that Coso Well 1 is very active at the surface, and the float is thrown up the well bore some 5 to 10 feet and becomes tangled in the support line. If the float returns to the water surface after entangling the line, the recorder indicates a greater depth than the actual depth. If it does not return to the water surface the actual depth could be greater than indicated if the water surface recedes.

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[2] A photographic study of the Coso mud pots taken from the same position each week. Photographics are maintained by Code 266.

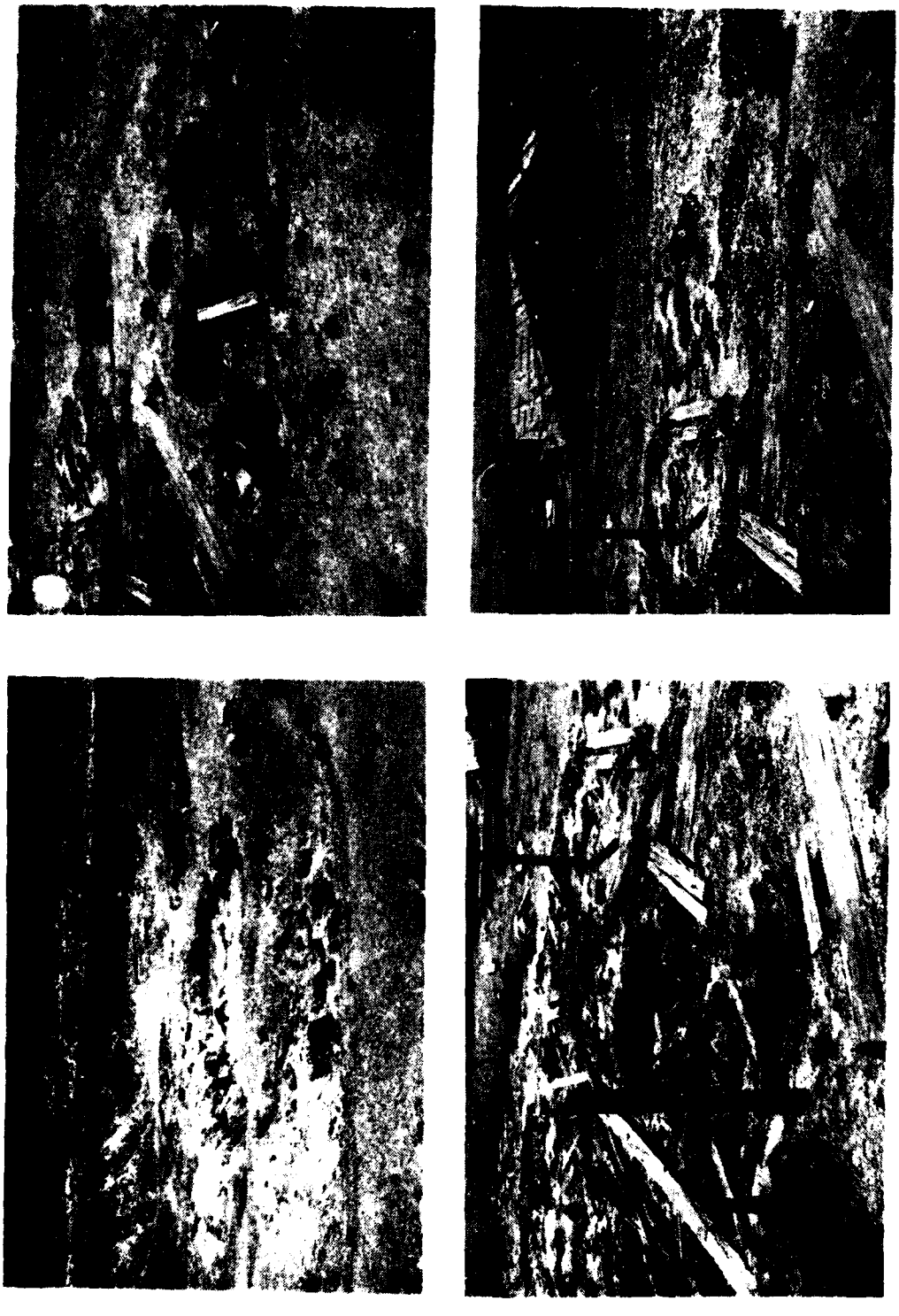


FIGURE 7. Coso Mud Pots - Dry Season (6-23-78).

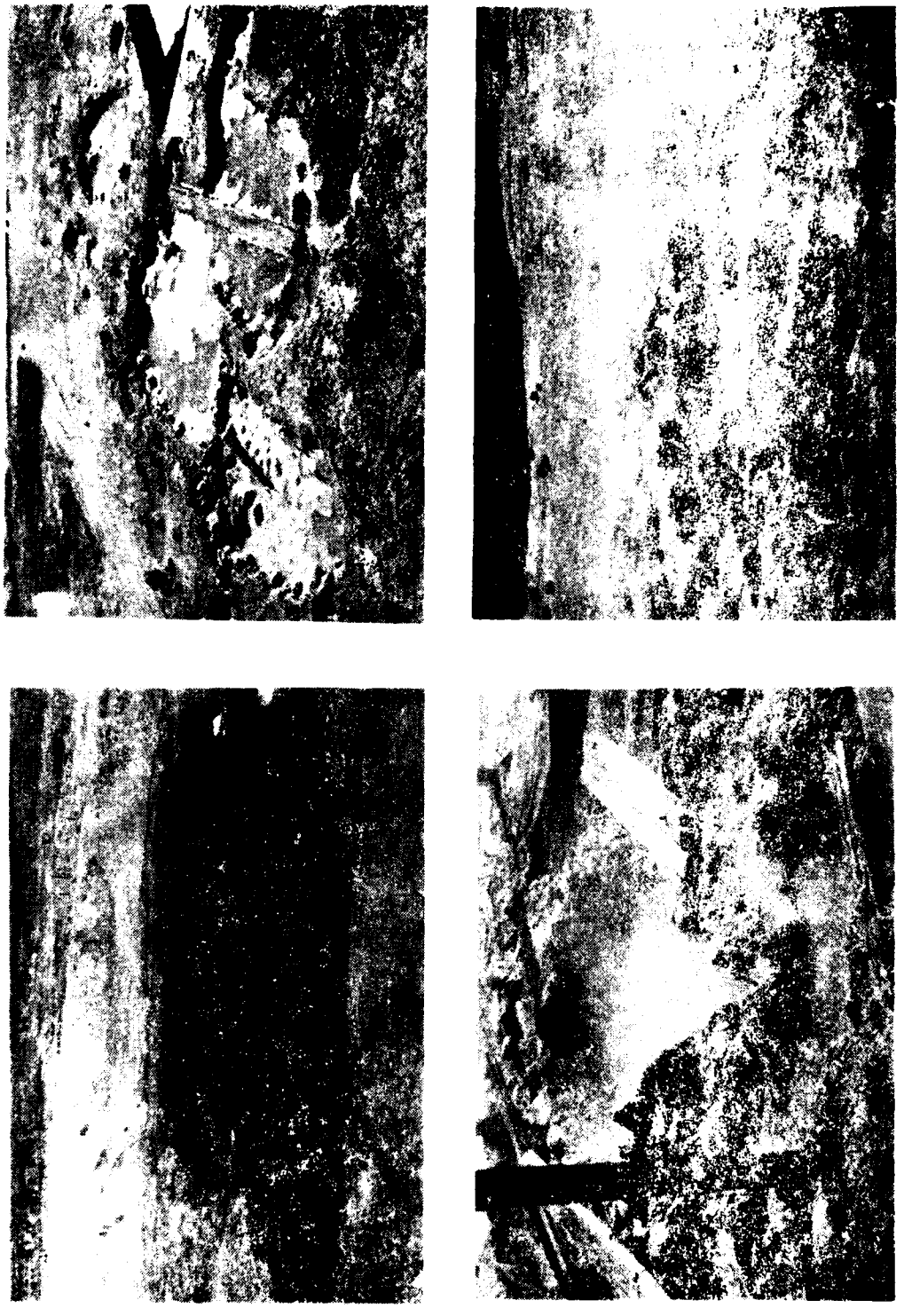


FIGURE 5. Coso Mud Pots – Wet Season (1–23–78).

The solution to the float problem has been to add lead pellets to bring the weight of the float up to the point where it is very near neutral buoyancy so that it is not thrown so high off the water surface. It has not yet become entangled since the extra weight was added. If the problem persists, a heavier float with a larger diameter will be fabricated.

Fortunately, several manual readings of the water depth were taken in 1978 and 1979. These recordings provide a baseline on which to judge the recorder data. The manual recordings are listed in Table 4.

TABLE 4. Coso Well 1 Depth Readings, from Ground Level.

Date	Depth, ft
7-14-78	146.5
8-24-78	148.3
1-25-79	149.2
4-12-79	151.5
5-11-79	146.0
1-18-80	141.0
2-21-80	139.2

Water depth of the well from the depth recorder is plotted in Figure 9 for August through December 1978 and in Figure 10 for 1979. The swells and bumps in the graph are more than likely as-yet-undiscovered float problems, as these readings are higher than the manual recordings. The float problem was discovered in September 1979 when the recorder was removed from the well in order to collect water samples for analysis. The float was replaced into the well without modification to see if the problem repeated itself, which it did in the later part of December 1979. An earlier incident of a tangled float line in May 1979 was not recognized at that time as an equipment problem.

Comparison of the recorder data with the manual readings shows that the water level of Coso Well 1 varies 11 feet in depth with the recorder and only 5.5 feet with the manual readings for 1978/79. This error is undoubtedly due to the float problem which warrants close attention over the next several months. In addition, monthly manual readings will be taken for the remainder of 1980.

COSO WELL 4 P-1

Coso Well 4 P-1, which is a hot, fresh-water well south of the old Coso Resort, was rehabilitated for sampling and water level monitoring in the fall of 1978. The recorder equipment became available in November 1979, and installation was completed on 4 December 1979. No particular

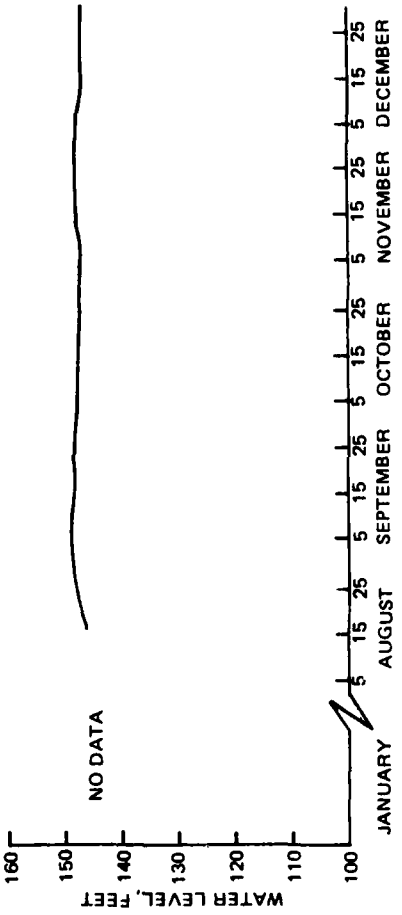


FIGURE 9. Water Level Monitoring, Coso Well 1.

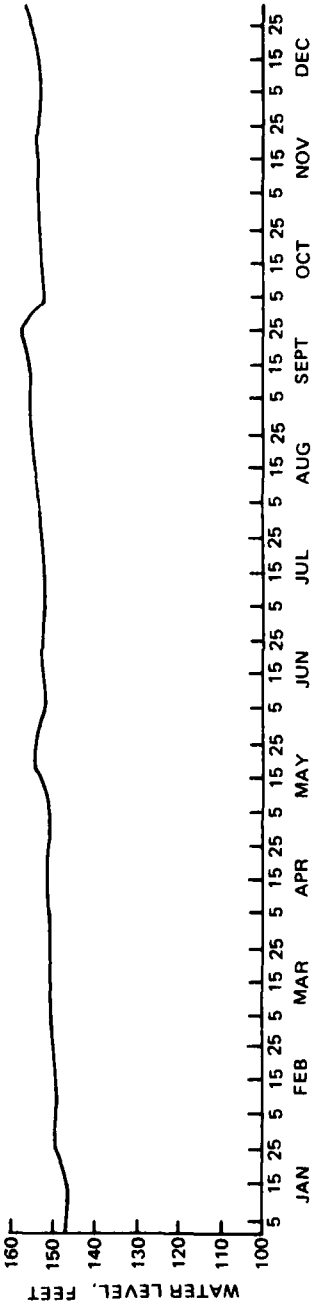


FIGURE 10. Water Level Monitoring, Coso Well 1.

corrosion problems were anticipated, as the well is good potable hot water with less than 400 parts per million (ppm) total dissolved solids. Within less than a month's operation, however, the stainless steel drive tape had failed twice due to stress corrosion cracking, probably because of dissolved gases and considerable moisture production by the well.

Moisture entry into the electronics also caused problems which hopefully have been solved by the application of a conformal Epoxy coating to the printed circuit board and components. This unit is also a Weather Measure recorder identical to the unit on Coso Well 1.

Both units are powered by 12-volt truck batteries which required recharging once a month, especially during the wet winter season. Solar cells, which were made available through the NWC Energy Office and installed on 15 February 1980, should preclude any loss of data due to a lack of battery power.

When installed, the recorder indicated 71 feet, 1 inch to water level, and periodic checks have indicated no change in level. The recorder reference point is 4 feet above ground level, which puts the water level at 67 feet.

MUD POT

Fluid level monitoring of one of the Coso ponds (designated the cistern), begun in August 1979, consists of weekly measurements from the top of a rocked-in cistern to the fluid level below. The changes in water level are listed in Table 5 and are plotted on a year-graph chart in Figure 11. This site is not one of the pools included in the weekly photographic study but it was selected because of the ease of making the water level measurement.

Fluid level monitoring on 3 additional ponds, begun in late October 1979, consists of taking relative elevations from fixed points to the surface of the water in each of the three ponds. The red and gray pools are actually mud pots which, in the dry season, are two separate pools; however, since the initiation of these measurements, these two pools became interconnected and have the same liquid surface level.

The water level data for all four pools monitored are presented in Table 6 and plotted in Figure 12. Liquid levels in all the ponds have risen since mid-September as the temperature turned cooler and evaporation losses decreased. The pools in general have higher fluid levels in winter than at any other time of the year.

TABLE 5. Water Level Data on Coso Pool (Cistern).

Date	Depth to water level, inches
8-26-79	24.5
9- 4-79	26.0
9-10-79	26.5
9-17-79	27.5
10- 1-79	24.0
10-10-79	23.8
10-15-79	22.5
10-22-79	22.5
10-29-79	21.5
11- 4-79	19.8
12- 1-79	19.0
12- 8-79	19.0
12-16-79	18.5
12-26-79	18.0
12-31-79	18.0

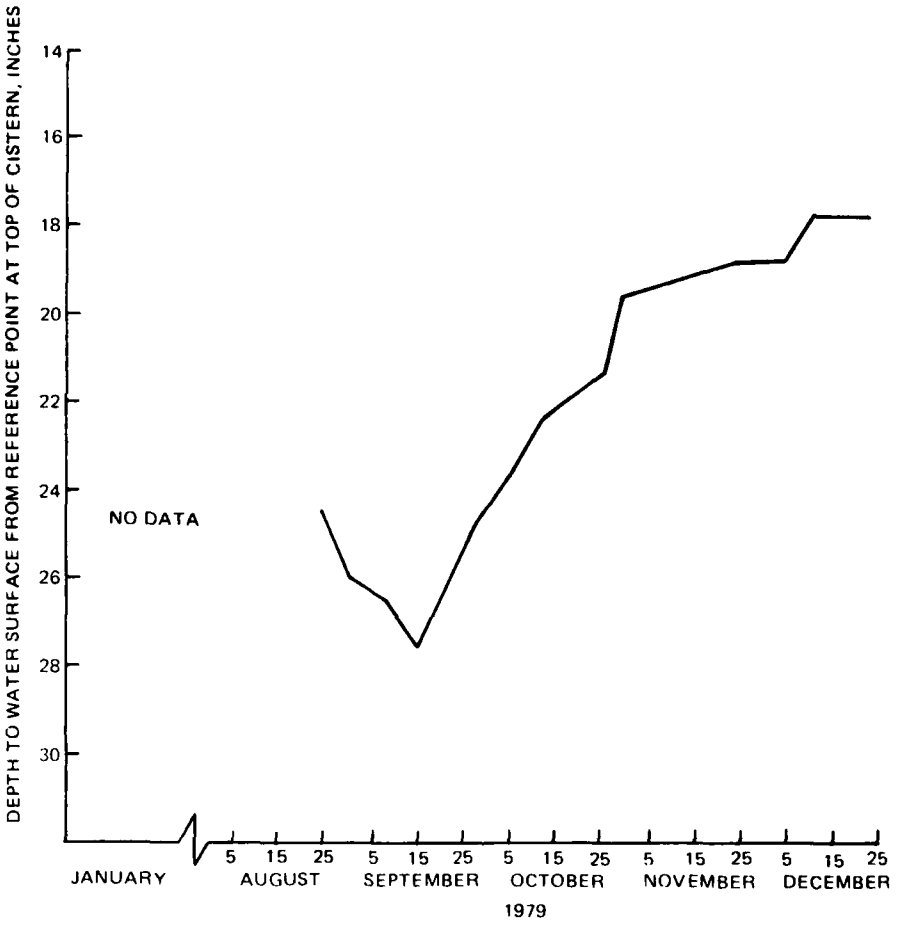
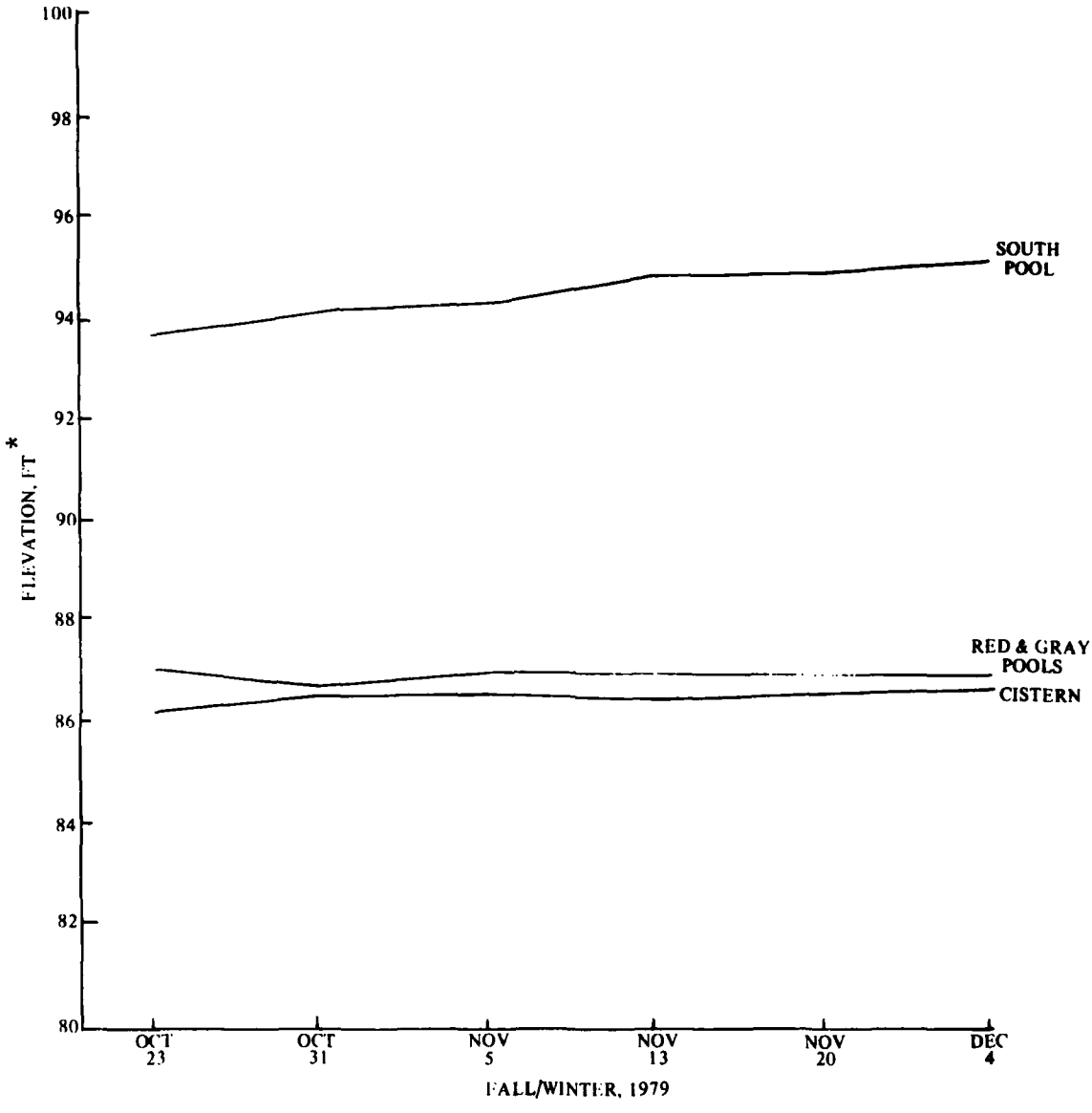


FIGURE 11. Water Level in Coso Pool.

TABLE 6. Elevation Data on Coso Pools Collected in Fall of 1979.

Date	Pool designation	Relative elevation, ft	Change in elevation, ft
10-03-79	Red pool	86.80	-
	Gray pool	86.80	-
	Cistern	86.29	-
	South pool	93.87	-
10-31-79	Red pool	86.63	-0.17
	Gray pool	86.63	-0.17
	Cistern	86.49	+0.20
	South pool	94.09	+0.22
11-05-79	Red pool	86.84	+0.04
	Gray pool	86.84	+0.04
	Cistern	86.48	+0.19
	South pool	94.26	+0.39
11-13-79	Red pool	86.89	+0.09
	Gray pool	86.89	+0.09
	Cistern	86.43	+0.14
	South pool	94.48	+0.61
11-20-79	Red pool	86.82	+0.02
	Gray pool	86.82	+0.02
	Cistern	86.44	+0.15
	South pool	94.58	+0.71
12-04-79	Red pool	86.81	+0.01
	Gray pool	86.81	+0.01
	Cistern	86.55	+0.26
	South pool	94.88	+0.01



NOTE: Elevations shown are relative to a benchmark established at the top of a rocked-in cistern and arbitrarily assigned an elevation of 100 feet.

FIGURE 12. Water Levels for Four Pools.

With the exception of the south pool, the monitored pools are located within the fenced compound on the east side of the Coso Resort buildings. The south pool is approximately 300 feet to the south of the other pools, and it too is situated on the Coso Fault line.

RAINFALL DATA AT COSO RESORT, HAIWEE RESERVOIR, AND ROSE VALLEY RANCH

Five rain-monitoring stations were installed in the Coso Resort area in late September 1979. Thus far they have registered 5.23 inches of rain this winter on the slopes surrounding the Coso Resort. Locations of the sites are shown on the map, Figure 13.

The instruments are battery-powered digital-readout gauges which can be reset after each rain, or if not, will accumulate the total rainfall over any given period of time up to 100 inches of rain. Manual reading funnel gauges are also installed at each site in order to check on the accuracy of the electronic instruments.

Data collected thus far from the Coso stations are presented in Table 7.

Data previously collected by the Los Angeles Department of Water and Power at the lower end of Haiwee Reservoir and from Rose Valley Ranch are presented in Table 8. This table also includes rainfall collected at Coso by NWC, Code 26305, from late 1978 through June 1979. The September 1979 Coso data are taken from the new rain station sites.

The 1979 rainfall at Haiwee Reservoir (4.97 inches) was only 41% of that received in calendar year 1978. This station is the only near-Coso site with complete data for both years. It should be noted that the accumulated totals in Table 8 for Haiwee, Rose Valley, and Coso are on a calendar year basis rather than on the fiscal year basis which the power plant utilizes.

WATER ANALYSIS OF COSO WELLS

Chemical analysis of three Coso area wells is presented in Table 9.

Coso Well 1, 374 feet deep, is assumed to be drilled into the upper level of the geothermal reservoir. Reasoning for this assumption is that chemical analysis of water samples from this well, especially the

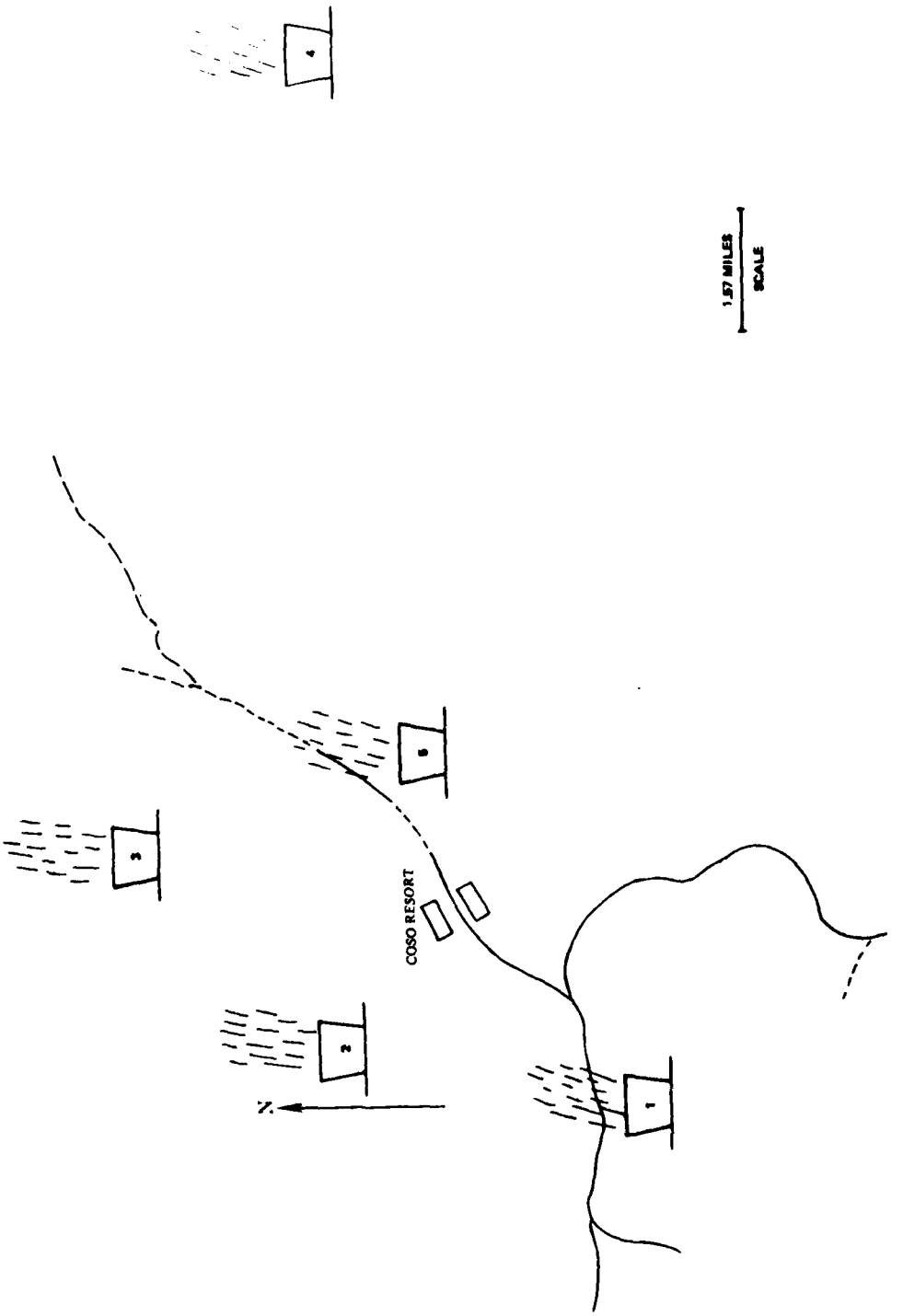


FIGURE 13. Rain Monitoring Station Locations.

TABLE 7. Coso Rainfall Monitoring Station, Inches of Rainfall.

Date	1		2		3		4		5	
	Funnel	Tipping bucket	Funnel	Tipping bucket	Funnel	Tipping bucket	Funnel	Tipping bucket	Funnel	Tipping bucket
9-28-79	0.32	0.27	0.28	0.21	0.26	0.29	0.20	0.21	0.26	0.27
9-29-79	1.90	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
1-05-80	0.10	-	0.10	0.10	0.10	0.12	0.10	0.10	0.10	0.10
1-14-80	0.86	0.73	0.82	0.67	0.77	0.87	1.00	0.90	0.88	0.84
1-18-80	0.02	0.03	0.0	0.01	0.0	0.02	0.0	0.01	0.0	0.0
1-30-80	0.42	0.35	0.36	0.31	0.37	0.38	0.54	0.45	0.44	0.40
2-14-80	1.30	1.24	1.35	1.10	1.15	0.01	0.97	0.01	0.94	0.89
2-19-80	-	-	-	-	-	-	1.93	-	2.075	1.90
2-20-80	2.30	1.78	2.37	2.19	2.38	-	0.55	-	0.41	0.31

Note: The rainfall recorded for a particular date includes any rain that occurred after the previous reading. The instruments are reset after each reading. Total rainfall for each station is the sum of the data in that column.

TABLE 8. Precipitation Data From Haiwee Reservoir, Rose Valley Ranch, and Coso.

Date	Haiwee		Rose Valley Ranch		Coso	
	Precipitation	Cumulative Precipitation	Precipitation	Cumulative Precipitation	Precipitation	Cumulative Precipitation
2-5-78	0.11	0.11	No 1978 Data Available		No Data Available	
6	0.69	0.80				
7	0.04	0.84				
8	0.36	1.20				
9	1.17	2.37				
10	1.21	3.58				
11	0.71	4.29				
13	0.46	4.75				
28	trace	4.75				
3-1-78	1.35	6.10				
2	0.11	6.21				
3	0.07	6.28				
4	0.54	6.82				
5	0.58	7.40				
10	0.04	7.44				
21	0.02	7.46				
22	0.22	7.68				
31	1.65	9.33				
4-1-78	0.47	9.80				
9	0.08	9.88				
16	0.10	9.98				
5-2-78	0.04	10.02				

TABLE 8. (Contd.)

Date	Haiwee		Rose Valley Ranch		Coso	
	Precipitation	Cumulative Precipitation	Precipitation	Cumulative Precipitation	Precipitation	Cumulative Precipitation
7-25-78	0.31	10.33			No Data	
26	0.03	10.36				
27	0.05	10.41				
8-5-78	0.02	10.43				
6	0.05	10.48				
9-5-78	0.14	10.62				
6	0.74	11.36				
10-31-78	0.08	11.44				
11-11-78					0.07	0.07
12	0.12	11.56			0.15	0.22
14	0.13	11.69			0.01	0.23
22	0.02	11.71				0.23
23	0.03	11.74				0.23
12-17-78	0.15	11.89			0.19	0.42
18	0.18	12.07			0.14	0.56
19	0.03	12.10				0.56
1-4-79	0.15	0.15				0
5	0.22	0.37				0
6	0.04	0.41	No Prior Data			0
8	0.03	0.44				0
9	0.08	0.52				0
10	trace	0.52				0
5	0.28	0.80				
14			0.35	0.35		0.46
16	0.13	0.93		0.35	0.46	0.46

TABLE 8. (Contd.)

Date	Haiwee		Rose Valley Ranch		Coso	
	Precipitation	Cumulative Precipitation	Precipitation	Cumulative Precipitation	Precipitation	Cumulative Precipitation
1-17-79	0.04	0.97		0.35		0.46
28	0.04	1.01		0.35		
31	0.67	1.68	1.00	1.35	1.00	1.46
2-1-79	0.30	1.98		1.35		
13				1.35	0.22	1.68
14	0.53	2.51	0.75	2.10	0.01	1.69
20					0.03	1.72
21	0.11	2.62		2.10	0.01	1.73
22	0.07	2.69		2.10		
23			0.52	2.62		
3-13-79					0.02	1.75
14					0.02	1.77
15	trace					
16	0.04	2.73	0.03	2.65		
19	0.05	2.78	0.81	3.46	0.43	2.20
20	1.16	3.94	0.05	3.51	0.06	2.26
21	0.12	4.06	0.01	3.52		
27	0.05	4.11	0.06	3.58	0.10	2.36
28	0.22	4.33	0.17	3.75	0.04	2.40
29	0.12	4.45				
4-25-79			0.01	3.76		
5-2-79	0.01	4.46			0.26	2.66
9-25-79	0.34	4.80	0.28	4.04		
30	0.03	4.83		4.04	0.01	2.67
10-1-79	0.01	4.84		4.04		
20	0.09	4.93		4.04		

TABLE 8. (Contd.)

Date	Haiwee		Rose Valley Ranch		Coso	
	Precipitation	Cumulative Precipitation	Precipitation	Cumulative Precipitation	Precipitation	Cumulative Precipitation
10-21-79	0.01	4.94		4.04		2.67
12-25-79	0.02	4.96		4.04	0	2.67
31	0.01	4.97		4.04		2.67

TABLE 9. Chemical Analysis of Coso Resort Area Wells.

Constituent (in ppm)	Coso Well 1 (3 October 1979)	Well 4P-1 (1 January 1979)	Well 4K-1 (11 July 1979)
Ca	12	3.3	6.1
Mg	0.3	<0.01	0.48
Na	4050	30	37
K	900	17	7.1
CO_3	120	0	0.0
HCO_3	0	50.2	15.6
SO_4	150	52	80
Cl	8500	<1.8	7.4
NO_3	2.1	2.2	4.0
NO_2	<0.1	0.10	<0.001
SiO_2	77	256	57
F	8.6	0.53	0.45
B	110	<0.01	0.06
Fe	1.9	0.23	0.14
Mn	1.4	-	0.17
PO_4	0	<0.1	<0.10
Cu	<0.02	0.01	<0.01
OH	-	0	0
Br	8.5	<0.1	1.0
As	16.7	<0.01	<0.01
NH_4	-	0.85	3.0
Li	-	0.01	0.04
Hg	<0.001	0.0003	<0.0002
Electrical conductivity, K x 10^6 Micromhos	-	220	260
Total dissolved solids	-	387	212
pH (lab)	8.3	7.0	6.7

chloride, agrees closely with the analysis of samples taken from Coso Exploratory Hole No 1 (CGEH-1), completed in 1977 to a depth of 4823 feet. The first chemical analysis of Coso Well 1 was published in 1968.[3] USGS has also sampled and published an analysis of both Coso Well 1 and CGEH-1.[4]

Wells 4P-1 and 4K-1, located approximately 1 mile to the south of Coso Well 1, are both fresh-water hot wells as indicated by the low chloride content and total dissolved solids of the water. Well 4P-1 evidently supplied fresh water for the area, as the remains of a 3,000-gallon steel storage tank and support tower are at the well site. This well was cleaned out and recased in 1978 to permit sampling and water level monitoring. Well 4K-1, some 150 feet from 4P-1, shows a large amount of mud when sampled, which on settling appears to be a fine claylike material. Both wells are situated in a high heat flow area on the west side of the fault scarp.

TEMPERATURE LOGS OF COSO RESORT AREA WELLS

Temperature logs of Coso Wells 1, 4P-1 and 4K-1 are shown in Figures 14 through 16. Coso Well 1 logs show little variation in temperature over the complete temperature profiles, while both Well 4P-1 and Well 4K-1 show slight differences in temperature over the complete depth of well. The temperature differences increase with depth below the water level; this occurrence indicates either an inflow of cold fluid and a drop in temperature or a change in inflow of geothermally heated fluids to the well and a corresponding change in well temperature.

A close examination of the temperature profiles of Well 4K-1 (Table 10) points out some of the possibilities for the differences indicated. However, no quantitative conclusions on inflow can be drawn with the limited data. It would be desirable to generate a model showing the hydrology and heat influx which generate the temperature profiles shown, but this will be deferred until more information is available through a second or third year of monitoring. It appears advisable to log Wells 4P-1 and 4K-1 monthly over the next year, and also to take water samples at both the 65-foot level and the 85-foot level for chemical analysis to determine any changes in composition due to inflow of fluids.

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[3]Naval Weapons Center. *Geologic Investigations at the Coso Thermal Area*, by Austin and Pringle. China Lake, CA, NWC, 1968. (NWC TP 4878, publication UNCLASSIFIED.)

[4]U. S. Geological Survey, Correspondence to Code 266 by Robert Fournier, September 1978.

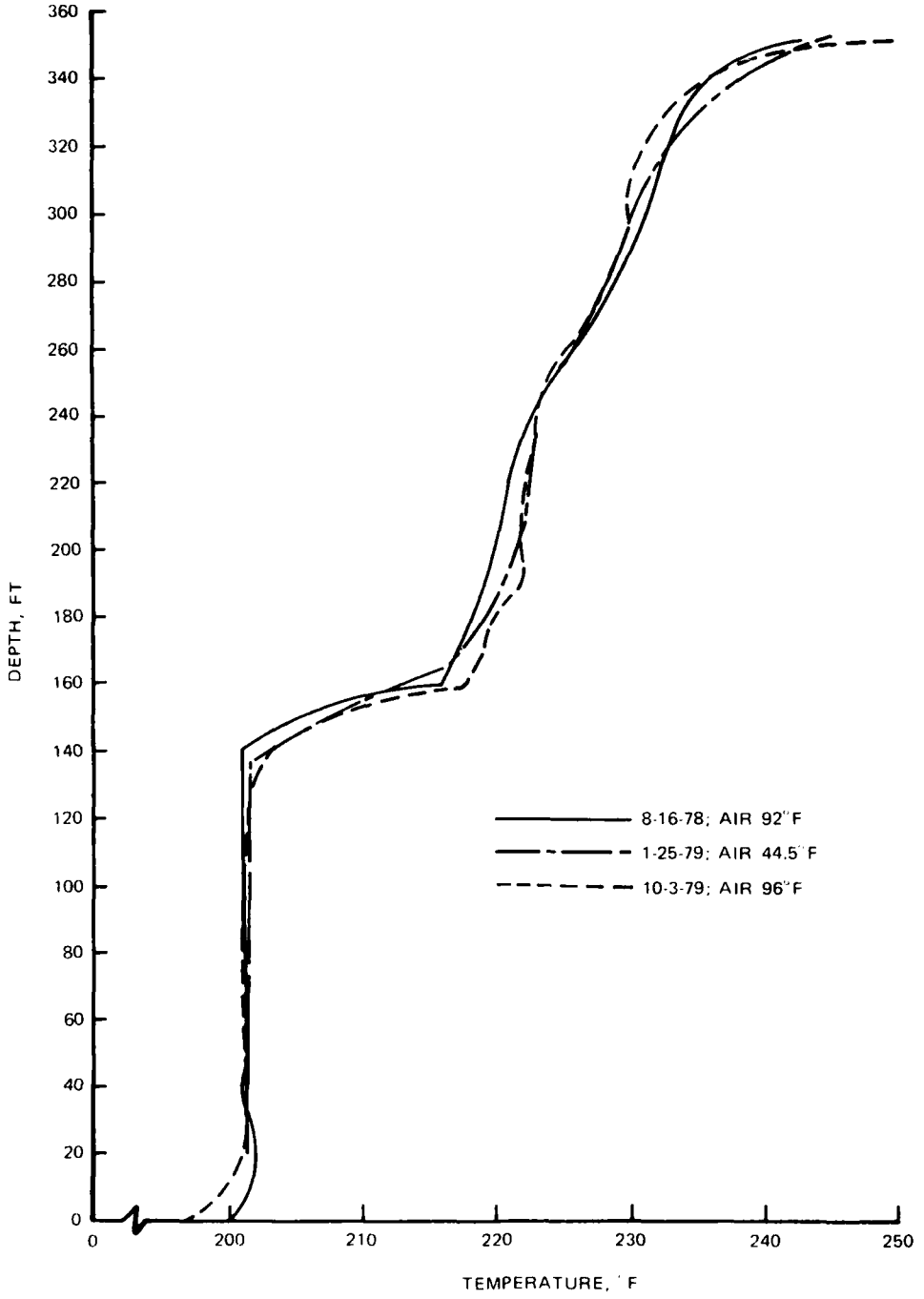

Figure 14. Temperature Log, Coso Well 1.

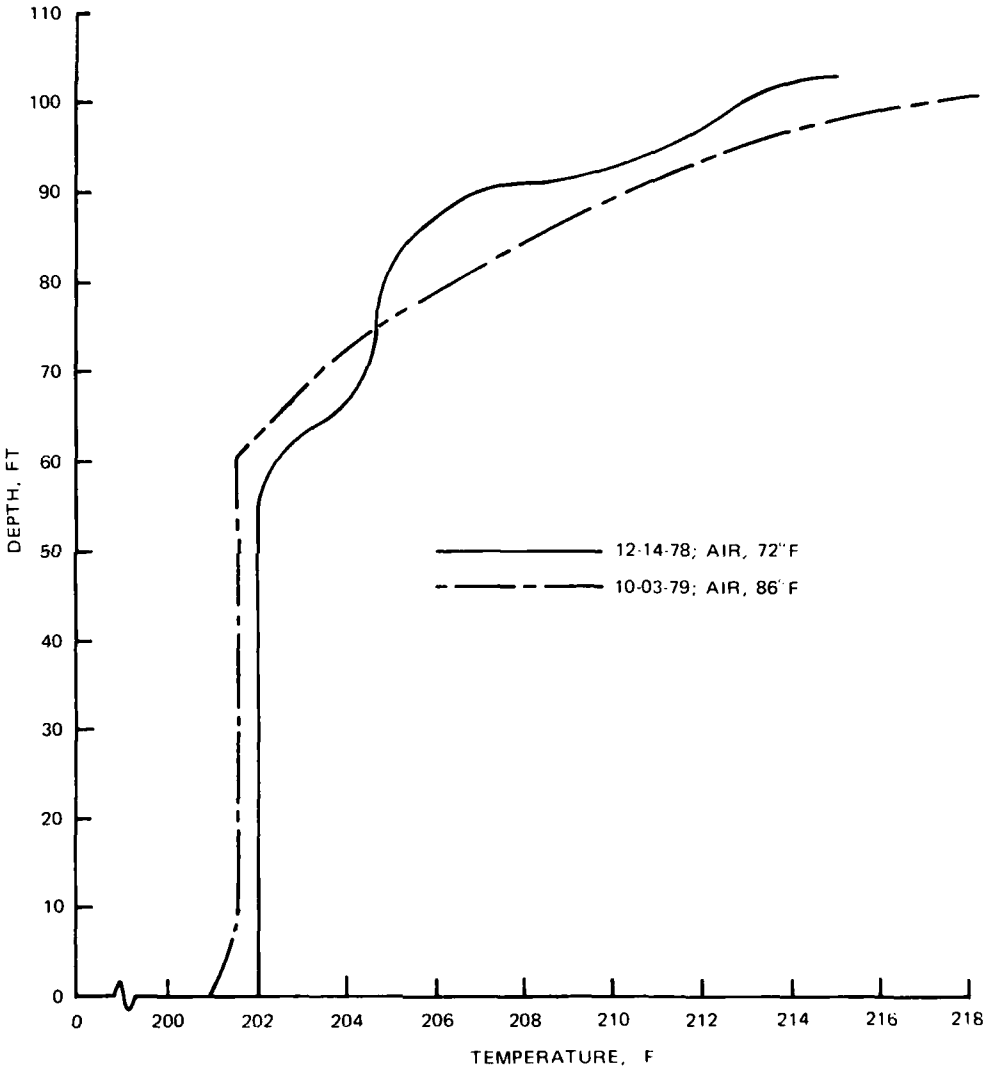

FIGURE 15. Temperature Log, Well 4P-1.

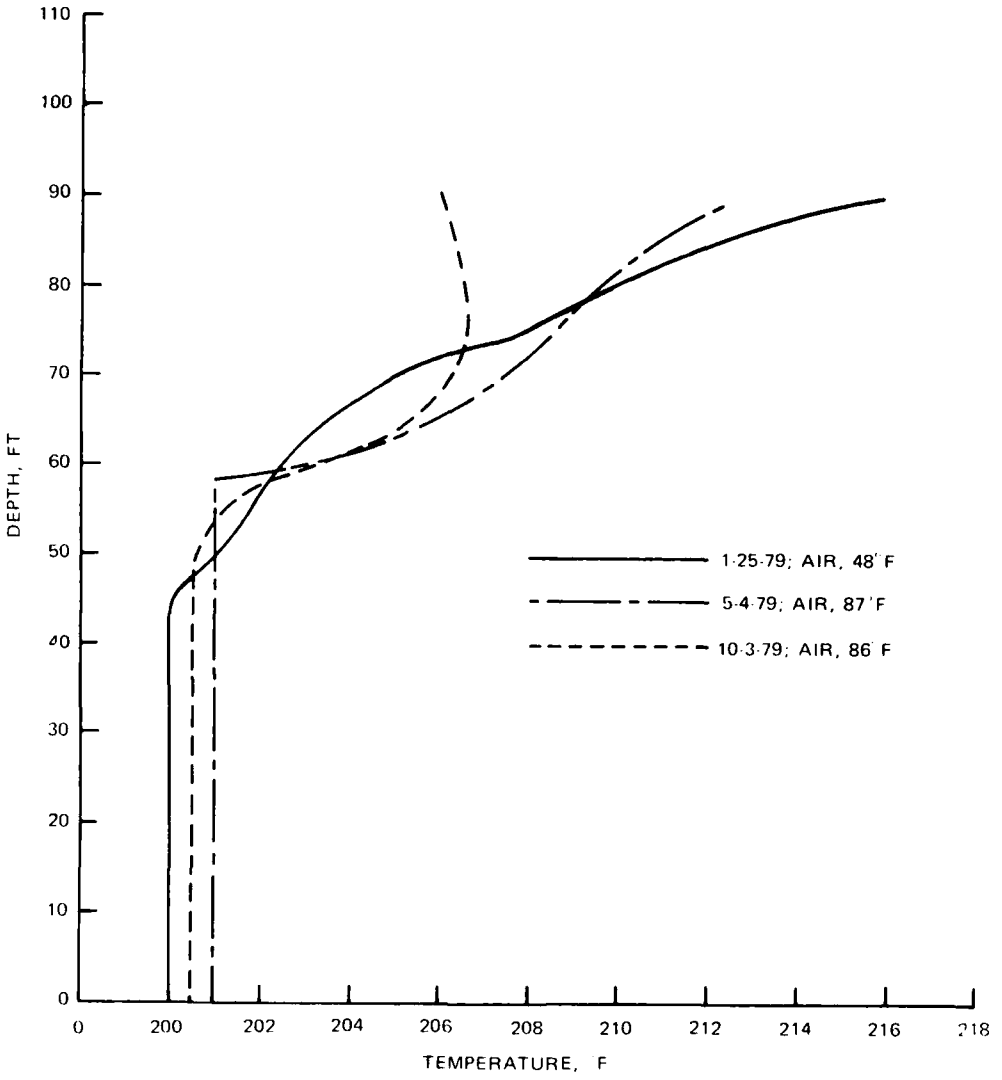

FIGURE 16. Temperature Log, Well 4K-1.

TABLE 10. Well 4K-1 Temperature Profiles.

25 January 1979 profile	Physical indication
Highest fluid level	Fluid inflow
Lowest fluid temp., 60-78 ft interval	Cold inflow
Highest fluid temp., 78-100 ft interval	Heating effect from this interval
Rainfall, prior 90 days: 1.02 in.	Probably no effect
4 May 1979 profile	**Physical indication**
Lowest fluid level	No fluid inflow
Highest fluid temp., 60-78 ft interval	No cooling effect
Mid-range temp., 78-100 ft interval	Either less heating effect or some cooling effect
Rainfall, prior 90 days: 0.94 in.	Probably no effect
3 October 1979 profile	**Physical indication**
Mid-range fluid level	Some fluid inflow
Mid-range temp., 60-73 ft interval	Cooling inflow
Lowest fluid temp., 73-100 ft interval	Cold inflow
Rainfall, prior 90 days: 0.27 in.	No effect

Geothermal gradients for the three wells are:

$$\text{Coso Well 1 gradient} = \frac{245.6 - 96}{360} = 0.416°\text{F/ft}$$

$$\text{Well 4P-1 gradient} = \frac{219 - 86}{103} = 1.291°\text{F/ft}$$

$$\text{Well 4K-1 gradient} = \frac{206.3 - 83}{100} = 1.233°\text{F/ft}$$

Appendix A

NUMERICAL DATA FROM STEAM FLOW METERS AT THE DEVIL'S KITCHEN AND COSO CORROSION ARRAYS

TABLE A-1. Devil's Kitchen Steam Flow Data. Data are $\sqrt{(-\Delta P)}$.

Date	High	Low	Noon
2-23-78	9.0	8.9	—
2-24-78	9.2	9.0	9.2
2-25-78	9.25	9.0	9.2
2-26-78	9.3	9.1	9.2
2-27-78	9.2	9.05	9.2
2-28-78	9.3	9.1	9.2
3-01-78	9.3	9.1	9.25
3-02-78	9.25	9.1	9.2
3-03-78	9.2	9.0	9.15
3-04-78	9.4	9.1	9.3
3-05-78	9.35	9.2	9.25
3-06-78	9.2	9.05	9.2
3-07-78	9.2	9.05	9.1
3-08-78	9.35	9.2	9.25
3-09-78	9.5	9.2	9.4
3-10-78	9.3	9.2	9.25
3-11-78	9.3	9.2	9.2
3-12-78	9.3	9.1	9.2
3-13-78	9.3	9.0	9.1
3-14-78	9.2	9.0	9.1
3-15-78	9.2	9.0	9.1
3-16-78	9.25	9.05	9.15
3-17-78	9.3	9.1	9.2
3-18-78	9.5	9.25	9.3
3-19-78	9.45	9.2	9.3
3-20-78	9.3	9.2	9.2
3-21-78	9.35	9.2	9.3
3-22-78	9.3	9.2	9.2
3-23-78	9.3	9.1	9.2
3-24-78	9.15	9.0	9.1
3-25-78	9.25	9.1	9.15
3-26-78	9.3	9.2	9.15
3-27-78	9.3	9.2	9.3
3-28-78	9.3	9.15	9.2
3-29-78	9.3	9.15	9.2
3-30-78	9.3	9.1	9.1
3-31-78	9.4	9.2	9.2
4-01-78	9.35	9.2	9.25
4-02-78	9.3	9.1	9.2
4-03-78	9.2	9.1	9.15
4-04-78	9.35	9.15	9.3
4-05-78	9.3	9.1	9.2
4-06-78	9.4	9.3	9.3
4-07-78	9.3	9.1	9.2

TABLE A-1. (Contd.)

Date	High	Low	Noon
4-08-78	9.2	9.0	9.1
4-09-78	9.15	8.95	9.1
4-10-78	9.2	9.0	9.1
4-11-78	9.3	9.15	9.25
4-12-78	9.3	9.2	9.2
4-13-78	9.3	9.2	9.25
4-14-78	9.3	9.1	9.2
4-15-78	9.4	9.1	9.2
4-16-78	9.2	8.9	9.0
4-17-78	9.05	8.9	9.0
4-18-78	9.2	9.0	9.1
4-19-78	9.3	9.15	9.2
4-20-78	9.3	9.15	9.3
4-21-78	9.2	9.0	9.1
4-22-78	9.15	9.0	9.05
4-23-78	9.2	9.0	9.1
4-24-78	9.2	9.1	9.2
4-25-78	9.2	9.1	9.2
4-26-78	9.1	9.0	
4-27-78	9.1	9.0	9.0
4-28-78	9.2	9.0	9.1
4-29-78	9.3	9.0	9.2
4-30-78	9.35	9.15	9.3
5-01-78	9.2	9.0	9.05
5-02-78	9.1	8.9	9.0
5-03-78	9.3	9.0	9.1
5-04-78	9.4	9.1	9.2
5-05-78	9.2	8.9	9.1
5-06-78	9.1	8.9	9.0
5-07-78	9.1	8.8	8.95
5-08-78	9.05	8.9	9.0
5-09-78	9.2	9.05	9.1
5-10-78	9.1	8.9	9.1
5-11-78	9.1	8.9	9.0
5-12-78	9.1	8.8	8.9
5-13-78	9.25	9.0	9.1
5-14-78	9.2	9.1	9.2
5-15-78	9.3	9.0	9.2
5-16-78	9.0	8.8	8.9
5-17-78	9.15	8.8	9.0
5-18-78	9.0	9.0	8.9
5-19-78	9.1	8.9	9.0
5-20-78	9.2	9.0	9.1
5-21-78	9.2	9.0	9.1

TABLE A-1. (Contd.)

Date	High	Low	Noon
5-22-78	9.2	9.1	9.1
5-23-78	9.1	8.9	9.1
5-24-78	9.2	9.0	9.0
5-25-78	9.1	9.0	9.0
5-26-78	9.0	8.9	9.0
5-27-78	9.1	8.9	8.9
5-28-78	9.15	8.9	9.0
5-29-78	9.25	9.0	9.1
5-30-78	9.3	9.2	9.1
5-31-78	9.2	9.0	9.1
6-01-78	9.2	9.1	9.1
6-02-78	9.15	9.0	9.0
6-03-78	9.15	8.9	9.0
6-04-78	9.1	8.95	9.0
6-05-78	9.1	8.95	9.0
6-06-78	9.15	8.9	9.0
6-07-78	9.2	9.1	9.0
6-08-78	9.2	9.0	9.0
6-09-78	9.2	9.0	9.2
6-10-78	9.2	9.0	9.2
6-11-78	9.1	8.9	9.0
6-12-78	9.1	8.9	9.0
6-13-78	9.1	8.9	9.0
6-14-78	9.1	9.0	9.0
6-15-78	9.15	9.0	9.0
6-16-78	9.1	8.9	9.0
6-17-78	9.1	8.9	8.9
6-18-78	9.2	9.0	9.1
6-19-78	9.2	9.0	9.0
6-20-78	9.1	9.0	9.0
6-21-78	9.2	9.0	9.0
6-22-78	9.2	9.0	9.1
6-23-78	9.1	9.0	9.0
6-24-78	9.1	9.0	9.0
6-25-78	9.2	9.0	9.0
6-26-78	9.2	9.0	9.1
6-27-78	9.05	8.9	9.0
6-28-78	9.0	8.9	8.9
6-29-78	9.1	8.9	8.9
6-30-78	9.1	8.9	9.0
7-01-78	9.1	9.0	9.0
7-02-78	9.2	9.0	9.0
7-03-78	9.1	9.0	9.0
7-04-78	9.1	9.0	9.0

TABLE A-1 (Cont'd)

Date	High	Low	Noon
7-05-78	9.1	9.0	9.0
7-06-78	9.1	9.0	9.0
7-07-78	9.1	9.0	9.0
7-08-78	9.1	8.9	9.0
7-09-78	9.2	9.0	9.0
7-10-78	9.2	9.0	9.1
7-11-78	9.2	9.0	9.1
7-12-78	9.1	9.0	9.0
7-13-78	9.1	8.9	9.1
7-14-78	9.1	8.9	9.0
7-15-78	9.2	9.0	9.0
7-16-78	9.2	9.0	9.1
7-17-78	9.1	9.0	9.0
7-18-78	9.1	8.9	8.9
7-19-78	9.1	8.9	9.0
7-20-78	9.2	9.0	9.0
7-21-78	9.1	8.9	9.0
7-22-78	9.1	8.9	9.0
7-23-78	9.1	8.9	9.0
7-24-78	9.05	8.7	8.9
7-25-78	9.0	8.8	8.9
7-26-78	9.1	8.9	9.0
7-27-78	9.2	9.0	9.2
7-28-78	9.2	8.9	9.1
7-29-78	9.2	9.0	9.0
7-30-78	9.2	9.0	9.1
7-31-78	9.25	9.05	9.1
8-01-78	9.2	9.0	9.1
8-02-78	9.2	9.0	9.0
8-03-78	9.2	9.0	9.1
8-04-78	9.2	8.9	9.0
8-05-78	9.15	8.9	9.1
8-06-78	9.1	8.9	9.0
8-07-78	9.2	8.9	9.1
8-08-78	9.2	9.0	9.1
8-09-78	9.2	8.8	9.1
8-10-78	9.2	9.0	9.0
8-11-78	9.15	8.9	9.1
8-12-78	9.2	9.0	9.0
8-13-78	9.1	8.9	9.0
8-14-78	9.1	9.0	9.0
8-15-78	9.2	8.9	9.0
8-16-78	9.2	9.1	9.0
8-17-78	9.2	8.9	9.0

TABLE A-1 (Contd.)

Date	High	Low	Noon
8-18-78	9.2	8.8	8.9
8-19-78	9.2	9.0	9.0
8-20-78	9.1	9.0	9.1
8-21-78	9.1	8.9	9.0
8-22-78	9.2	9.0	9.05
8-23-78	9.1	8.9	9.0
8-24-78	9.1	8.9	8.9
8-25-78	9.1	8.9	9.0
8-26-78	9.1	8.9	9.0
8-27-78	9.1	8.9	9.0
8-28-78	9.1	8.9	9.0
8-29-78	9.1	9.0	9.0
8-30-78	9.2	9.0	9.1
8-31-78	9.2	9.0	9.0
9-01-78	9.1	8.9	9.0
9-02-78	9.1	9.0	9.0
9-03-78	9.1	8.9	9.0
9-04-78	9.1	8.9	9.0
9-05-78	9.1	9.0	9.0
9-06-78	9.0	8.9	9.0
9-07-78	9.0	8.8	8.9
9-08-78	9.0	8.8	8.9
9-09-78	9.0	8.9	9.0
9-10-78	9.1	8.9	9.1
9-11-78	9.1	8.8	9.0
9-12-78	9.0	8.9	8.9
9-13-78	9.1	8.9	9.0
9-14-78	9.1	8.8	9.0
9-15-78	8.9	8.8	8.8
9-16-78	9.1	8.9	9.0
9-17-78	9.2	8.8	9.2
9-18-78	9.0	8.7	8.9
9-19-78	8.9	8.7	8.7
9-20-78	9.0	8.7	8.8
9-21-78	9.0	8.9	8.9
9-22-78	9.0	8.8	8.9
9-23-78	9.0	8.8	8.9
9-24-78	9.0	8.9	8.9
9-25-78	9.1	8.9	9.0
9-26-78	9.1	8.9	9.0
9-27-78	9.1	8.9	9.0
9-28-78	9.1	8.9	9.0
9-29-78	9.1	8.9	9.0
9-30-78	9.1	8.95	9.0

TABLE A-1. (Contd.)

Date	High	Low	Noon
10-01-78	9.1	8.9	9.0
10-02-78	9.1	8.9	9.0
10-03-78	9.1	8.9	9.0
10-04-78	9.1	8.95	9.0
10-05-78	9.1	8.9	9.0
10-06-78	9.1	8.9	9.0
10-07-78	9.1	8.9	9.0
10-08-78	9.1	8.9	9.0
10-09-78	9.0	8.9	8.9
10-10-78	9.0	8.8	8.9
10-11-78	9.1	8.9	9.0
10-12-78	9.1	8.9	9.0
10-13-78	9.0	8.8	8.9
10-14-78	9.0	8.8	8.9
10-15-78	9.1	8.9	9.0
10-16-78	9.1	9.0	9.0
10-17-78	9.0	8.8	8.9
10-18-78	8.9	8.8	8.9
10-19-78	8.9	8.8	8.9
10-20-78	9.0	8.9	8.9
10-21-78	9.1	8.8	9.0
10-22-78	8.9	8.7	8.8
10-23-78	9.0	8.7	8.8
10-24-78	9.1	8.9	9.0
10-25-78	8.9	8.8	8.9
10-26-78	8.9	8.7	8.8
10-27-78	9.0	8.8	8.9
10-28-78	9.0	8.9	8.9
10-29-78	9.1	9.0	9.0
10-30-78	9.0	8.8	9.0
10-31-78	8.8	8.7	8.7
11-01-78	8.9	8.8	8.8
11-02-78	8.9	8.8	8.8
11-03-78	8.9	8.7	8.7
11-04-78	9.0	8.8	8.9
11-05-78	9.1	8.9	9.0
11-06-78	9.0	8.8	8.8
11-07-78	9.0	8.8	9.0
11-08-78	9.1	9.0	9.1
11-09-78	9.3	9.1	9.3
11-10-78	9.2	9.0	9.2
11-11-78	9.1	8.8	9.0
11-12-78	8.9	8.7	8.8
11-13-78	8.9	8.9	8.9

TABLE A-1. (Contd.)

Date	High	Low	Noon
11-14-78	8.9	8.8	8.8
11-15-78	8.9	8.8	8.8
11-16-78	9.0	8.8	8.9
11-17-78	9.0	8.9	8.9
11-18-78			--
11-19-78			
11-20-78			
11-21-78	9.0	8.8	9.0
11-22-78	8.9	8.7	8.8
11-23-78	8.9	8.7	8.9
11-24-78	9.1	8.9	9.1
11-25-78	8.9	8.8	8.9
11-26-78	8.9	8.7	8.9
11-27-78	8.8	8.7	8.8
11-28-78	8.9	8.7	8.9
11-29-78	8.9	8.8	8.9
11-30-78	9.0	8.8	9.0
12-01-78	9.1	8.8	9.0
12-02-78	9.3	8.9	9.3
12-03-78	8.9	8.7	8.9
12-04-78	8.8	8.6	8.8
12-05-78	9.1	8.7	9.0
12-06-78	9.2	8.8	9.1
12-07-78	8.8	8.7	8.8
12-08-78	9.0	8.6	8.7
12-09-78	8.9	8.7	8.9
12-10-78	9.0	8.8	9.0
12-11-78	9.0	8.8	8.9
12-12-78	9.0	8.8	8.9
12-13-78	8.9	8.8	8.9
12-14-78			--
12-15-78			--
12-16-78			
12-17-78			
12-18-78			
12-19-78			
12-20-78			
12-21-78			
12-22-78	9.1	9.0	9.1
12-23-78	9.0	8.8	9.0
12-24-78	9.0	8.8	9.0
12-25-78	9.0	8.9	9.0
12-26-78	9.0	8.9	9.0
12-27-78	9.1	8.9	9.1

TABLE A-1. (Contd.)

Date	High	Low	Noon
12-28-78			
12-29-78			
12-30-78			
12-31-78			
1-01-79			
1-02-79	8.9	8.8	
1-03-79	9.0	8.8	8.9
1-04-79	8.9	8.8	8.9
1-05-79	9.0	8.9	9.0
1-06-79	9.0	8.8	8.9
1-07-79	8.8	8.7	8.8
1-08-79	8.9	8.7	8.8
1-09-78	9.0	8.7	8.9
1-10-79	8.9	8.7	8.9
1-11-79	9.1	9.0	9.0
1-12-79	9.1	8.8	8.9
1-13-79	8.9	8.7	8.8
1-14-79	9.1	9.0	9.1
1-15-79	9.1	8.9	9.0
1-16-79	9.0	8.8	8.9
1-17-79	9.1	8.9	9.0
1-18-79	9.0	8.7	8.9
1-19-79	8.9	8.7	8.8
1-20-79	8.9	8.7	8.8
1-21-79	9.1	9.0	9.1
1-22-79	9.1	8.8	8.9
1-23-79	9.0	8.9	8.95
1-24-79	9.2	9.0	9.2
1-25-79	9.2	8.7	9.1
1-26-79			
1-27-79			
1-28-79			
1-29-79			
1-30-79			
1-31-79			
2-01-79			
2-02-79	9.0	8.8	
2-03-79	9.0	8.8	8.9
2-04-79	9.1	8.9	9.0
2-05-79	9.1	8.9	9.0
2-06-79	9.05	8.9	9.0
2-07-79	9.1	8.9	9.1
2-08-79	9.0	8.9	9.0
2-09-79	9.1	8.9	9.0

TABLE A-1. (Contd.)

Date	High	Low	Noon
2-10-79	9.1	9.0	9.0
2-11-79	9.05	8.9	9.0
2-12-79	9.1	9.0	9.1
2-13-79	9.2	9.0	9.1
2-14-79	9.3	8.9	9.0
2-15-79	9.05	8.9	9.0
2-16-79	9.1	8.9	9.0
2-17-79	9.0	8.8	8.9
2-18-79	9.2	9.0	9.1
2-19-79	9.1	8.9	9.1
2-20-79	9.2	8.9	9.0
2-21-79	9.05	8.8	8.85
2-22-79			
2-23-79			
2-24-79			
2-25-79			
2-26-79	9.15	8.8	9.1
2-27-79	9.0	8.75	8.9
2-28-79	9.2	8.95	9.05
3-01-79	9.25	8.9	9.2
3-02-79	8.9	8.7	8.8
3-03-79	8.85	8.7	8.8
3-04-79	8.9	8.7	8.8
3-05-79	8.9	8.7	8.8
3-06-79	8.9	8.7	8.8
3-07-79	9.1	8.85	9.0
3-08-79	9.1	9.0	9.1
3-09-79	9.0	8.8	9.0
3-10-79	8.9	8.7	8.8
3-11-79	9.0	8.8	8.9
3-12-79	9.1	8.9	9.0
3-13-79	9.0	8.7	8.85
3-14-79	8.9	8.8	8.8
3-15-79	9.15	8.9	9.0
3-16-79	9.05	8.9	9.0
3-17-79	8.95	8.8	8.9
3-18-79	9.05	8.8	9.0
3-19-79	9.0	8.9	8.95
3-20-79	9.0	8.9	8.95
3-21-79	9.0	8.8	8.9
3-22-79	8.9	8.8	8.8
3-23-79	8.9	8.75	8.85
3-24-79	9.0	8.8	8.9
3-25-79	9.15	9.0	9.05

TABLE A-1. (Contd.)

Date	High	Low	Noon
3-26-79	9.2	9.0	9.0
3-27-79	9.1	8.9	8.9
3-28-79	9.1	8.85	9.0
3-29-79	8.75	8.5	8.8
3-30-79	9.0	8.7	8.9
3-31-79	9.0	8.7	8.85
4-01-79	9.0	8.9	8.95
4-02-79	9.1	8.8	9.0
4-03-79	8.9	8.7	8.8
4-04-79	9.0	8.8	8.85
4-05-79	9.1	8.9	9.0
4-06-79	9.05	8.9	9.0
4-07-79	8.9	8.8	8.9
4-08-79	9.0	8.8	8.95
4-09-79	9.2	8.9	9.15
4-10-79	9.0	8.8	8.9
4-11-79	9.0	8.8	8.9
4-12-79	8.9	8.7	8.7
4-13-79	9.0	8.8	8.9
4-14-79	9.0	8.8	8.9
4-15-79	9.0	8.8	8.9
4-16-79	9.1	8.9	9.0
4-17-79	9.0	8.9	9.0
4-18-79	8.9	8.7	8.8
4-19-79	8.8	8.6	8.7
4-20-79	8.9	8.7	8.8
4-21-79	9.0	8.8	8.9
4-22-79	9.0	8.8	9.0
4-23-79	8.9	8.8	8.9
4-24-79	8.9	8.7	8.8
4-25-79	8.9	8.7	8.8
4-26-79	9.0	8.8	8.9
4-27-79	8.9	8.7	8.8
4-28-79	8.9	8.8	8.9
4-29-79	9.0	8.8	8.9
4-30-79	9.1	8.9	8.9
5-01-79	9.1	8.7	9.0
5-02-79	8.9	8.7	8.8
5-03-79	8.8	8.7	8.7
5-04-79	8.9	8.7	8.8
5-05-79	9.1	8.9	9.0
5-06-79	9.1	8.9	9.0
5-07-79	9.0	8.8	8.9
5-08-79	8.9	8.7	8.9

TABLE A-1. (Contd.)

Date	High	Low	Noon
5-09-79	8.8	8.6	8.8
5-10-79	8.8	8.6	8.6
5-11-79	8.8	8.6	8.7
5-12-79	8.9	8.7	8.7
5-13-79	9.0	8.8	8.9
5-14-79	9.0	8.9	8.9
5-15-79	9.0	8.9	8.9
5-16-79	9.0	8.9	8.9
5-17-79	8.9	8.8	8.9
5-18-79	9.0	8.8	8.9
5-19-79	9.1	8.9	9.0
5-20-79	8.9	8.8	8.8
5-21-79	8.9	8.7	8.8
5-22-79	9.0	8.7	8.8
5-23-79	9.0	8.8	8.8
5-24-79	8.9	8.8	8.9
5-25-79	8.9	8.8	8.8
5-26-79	9.0	8.8	8.9
5-27-79	9.0	8.8	8.9
5-28-79	9.0	8.8	8.9
5-29-79	8.9	8.7	8.7
5-30-79	8.9	8.7	8.8
5-31-79	8.9	8.7	8.8
6-01-79	8.9	8.8	8.8
6-02-79	9.0	8.8	8.8
6-03-79	9.0	8.8	8.8
6-04-79	9.0	8.8	8.9
6-05-79	9.1	8.9	8.9
6-06-79	9.2	8.9	9.1
6-07-79	9.0	8.7	8.9
6-08-79	8.9	8.7	8.8
6-09-79	8.9	8.7	8.8
6-10-79	9.0	8.8	8.9
6-11-79	9.1	8.9	8.9
6-12-79	9.0	8.9	9.0
6-13-79	9.1	8.9	9.0
6-14-79	9.1	9.0	9.1
6-15-79	9.2	8.9	9.0
6-16-79	9.2	9.0	9.1
6-17-79	9.0	8.8	9.0
6-18-79	8.9	8.5	8.9
6-19-79	9.0	8.8	8.8
6-20-79	9.0	8.9	8.9
6-21-79	9.1	8.9	8.9

TABLE A-1. (Contd.)

Date	High	Low	Noon
6-22-79	9.0	8.9	8.9
6-23-79	9.1	8.9	9.0
6-24-79	9.1	8.9	9.0
6-25-79	9.0	8.9	8.9
6-26-79	9.0	8.9	8.9
6-27-79	9.1	8.9	9.0
6-28-79	9.1	8.9	9.0
6-29-79	9.1	8.9	9.0
6-30-79	9.2	9.0	9.1
7-01-79	9.2	9.0	9.0
7-02-79	9.0	8.9	9.0
7-03-79	9.0	8.9	8.9
7-04-79	9.0	8.9	9.0
7-05-79	9.0	8.9	8.9
7-06-79	9.0	8.8	8.9
7-07-79	9.0	8.8	8.9
7-08-79	9.0	8.8	8.9
7-09-79	9.0	8.9	9.0
7-10-79	9.2	8.9	9.0
7-11-79	9.1	8.9	9.0
7-12-79	9.1	8.9	9.0
7-13-79	9.2	9.0	9.1
7-14-79	9.2	9.0	9.0
7-15-79	9.1	9.0	9.0
7-16-79	9.1	8.9	8.9
7-17-79	9.1	8.9	9.0
7-18-79	9.2	9.0	9.1
7-19-79	9.2	8.8	9.1
7-20-79	9.0	8.9	9.0
7-21-79	9.1	8.9	9.0
7-22-79	9.1	8.9	8.9
7-23-79	9.1	8.9	9.0
7-24-79	9.1	8.9	9.0
7-25-79	9.1	8.9	9.0
7-26-79	9.1	8.9	9.0
7-27-79	9.1	8.9	9.0
7-28-79	9.1	8.9	8.9
7-29-79	9.0	8.9	8.9
7-30-79	9.0	8.9	9.0
7-31-79	9.0	8.9	8.9
8-01-79	9.1	8.9	9.0
8-02-79	9.1	9.0	9.0
8-03-79	9.1	9.0	9.0
8-04-79	9.1	8.9	9.0

TABLE A-1. (Contd.)

Date	High	Low	Noon
8-05-79	9.0	8.9	8.9
8-06-79	9.0	8.9	8.9
8-07-79	9.1	8.9	8.9
8-08-79	9.0	8.9	8.9
8-09-79	9.0	8.9	8.9
8-10-79	9.0	8.9	8.9
8-11-79	9.0	8.8	8.8
8-12-79	9.1	8.9	9.0
8-13-79	9.0	8.9	8.9
8-14-79	9.0	8.8	8.9
8-15-79	9.0	8.9	8.9
8-16-79	9.0	8.8	8.9
8-17-79	8.9	8.8	8.8
8-18-79	9.0	8.8	8.9
8-19-79	9.1	8.9	8.9
8-20-79	9.0	8.9	8.9
8-21-79	8.9	8.8	8.8
8-22-79	9.0	8.8	8.8
8-23-79	9.0	8.9	8.9
8-24-79	9.1	8.9	8.9
8-25-79	9.1	8.9	9.0
8-26-79	9.0	8.9	8.9
8-27-79	9.0	8.9	8.9
8-28-79	9.1	8.9	9.0
8-29-79	9.0	8.9	9.0
8-30-79	9.0	8.8	8.9
8-31-79	9.0	8.9	8.9
9-01-79	9.0	8.9	8.9
9-02-79	9.0	8.8	8.9
9-03-79	9.1	8.9	8.9
9-04-79	9.0	8.9	8.9
9-05-79	8.9	8.8	8.9
9-06-79	9.0	8.8	8.9
9-07-79	9.0	8.9	8.9
9-08-79	9.0	8.9	8.9
9-09-79	9.0	8.9	8.9
9-10-79	9.0	8.9	8.9
9-11-79	9.1	8.9	9.0
9-12-79	9.1	8.9	8.9
9-13-79	9.1	8.9	9.0
9-14-79	9.0	8.9	8.9
9-15-79	9.0	8.9	8.9
9-16-79	9.0	8.9	8.9
9-17-79	9.0	8.9	8.9

TABLE A-1. (Contd.)

Date	High	Low	Noon
9-18-79	9.0	8.9	8.9
9-19-79	9.1	8.9	8.9
9-20-79	9.0	8.9	9.0
9-21-79	9.0	8.9	8.9
9-22-79	9.0	8.9	8.9
9-23-79	9.0	8.9	8.9
9-24-79	9.0	8.9	8.9
9-25-79	9.0	8.8	8.9
9-26-79	9.0	8.8	8.9
9-27-79	9.0	8.9	8.9
9-28-79	8.9	8.8	8.9
9-29-79	9.0	8.8	8.8
9-30-79	9.0	8.9	8.9
10-01-79	8.9	8.8	8.9
10-02-79	8.9	8.8	8.9
10-03-79	8.9	8.8	8.9
10-04-79	8.9	8.8	8.9
10-05-79	9.0	8.8	8.9
10-06-79	9.1	8.9	9.0
10-07-79	9.1	8.9	9.0
10-08-79	9.1	9.0	9.0
10-09-79	9.0	8.8	8.9
10-10-79	8.9	8.8	8.8
10-11-79	9.0	8.9	8.9
10-12-79	9.1	9.0	9.0
10-13-79	9.1	9.0	9.0
10-14-79	8.9	8.8	8.9
10-15-79	8.9	8.8	8.9
10-16-79	9.0	8.8	8.9
10-17-79	9.1	9.0	9.1
10-18-79	9.1	9.0	9.1
10-19-79	9.2	9.1	9.1
10-20-79	9.1	8.9	9.0
10-21-79	8.9	8.7	8.8
10-22-79	8.9	8.8	8.8
10-23-79	9.0	8.8	8.9
10-24-79	9.0	8.9	8.9
10-25-79	9.1	8.9	8.9
10-26-79	8.9	8.8	8.9
10-27-79	9.0	8.8	8.9
10-28-79	9.1	8.9	9.0
10-29-79	8.9	8.7	8.9
10-30-79	9.0	8.8	8.9
10-31-79	9.0	8.9	9.0

TABLE A-1. (Contd.)

Date	High	Low	Noon
11-01-79	8.9	8.8	8.9
11-02-79	9.0	8.8	8.9
11-03-79	9.1	9.0	9.1
11-04-79	8.9	8.8	8.8
11-05-79	8.9	8.7	8.9
11-06-79	9.0	8.9	9.0
11-07-79	9.1	9.0	9.1
11-08-79	9.0	8.9	9.0
11-09-79	9.0	8.9	9.0
11-10-79			
11-11-79	9.0	8.9	8.9
11-12-79	8.9	8.8	8.8
11-13-79	9.0	8.8	8.9
11-14-79	8.9	8.8	8.9
11-15-79	8.9	8.7	8.8
11-16-79	9.1	8.9	9.0
11-17-79	9.2	8.9	9.1
11-18-79	9.0	8.8	8.9
11-19-79	8.9	8.8	8.8
11-20-79	9.1	8.8	8.8
11-21-79	9.1	8.8	8.9
11-22-79	9.0	8.9	8.9
11-23-79	9.1	8.9	9.0
11-24-79	9.1	8.8	9.0
11-25-79	8.8	8.7	8.7
11-26-79	8.8	8.7	8.8
11-27-79	8.9	8.8	8.8
11-28-79	8.9	8.7	8.8
11-29-79	8.9	8.8	8.9
11-30-79	8.9	8.8	8.9
12-01-79	8.9	8.8	8.9
12-02-79	8.8	8.7	8.8
12-03-79	9.0	8.8	8.9
12-04-79	9.0	8.9	9.0
12-05-79	9.1	8.9	9.1
12-06-79	9.0	8.8	9.0
12-07-79			
12-08-79	9.0	8.7	8.8
12-09-79	9.0	8.8	8.9
12-10-79	9.1	9.0	9.1
12-11-79	8.9	8.8	8.8
12-12-79	8.9	8.8	8.9
12-13-79	8.8	8.7	8.8
12-14-79	9.0	8.8	8.9

TABLE A-1. (Contd.)

Date	High	Low	Noon
12-15-79	9.0	8.9	9.0
12-16-79	8.9	8.8	8.9
12-17-79	9.0	8.8	8.9
12-18-79	9.1	8.9	9.0
12-19-79	9.0	8.9	9.0
12-20-79	9.1	8.9	9.0
12-21-79	9.1	9.0	9.1
12-22-79	9.0	8.8	8.9
12-23-79	8.9	8.8	8.9
12-24-79	8.9	8.8	8.9
12-25-79	–	–	–
12-26-79	8.9	8.8	8.9
12-27-79	8.9	8.7	8.8
12-28-79	8.9	8.7	8.8
12-29-79	9.0	8.9	9.0
12-30-79	9.0	8.8	9.0
12-31-79	9.0	8.9	9.0

TABLE A-2. Coso Steam Flow Rate Data from Barton Flow Meter. Data are $\sqrt{(-\Delta P)}$.

Date	High	Noon	Low
2-24-78	4.6	4.5	4.4
2-25-78	4.6	4.5	4.4
2-26-78	5.0	4.8	4.6
2-27-78	5.0	4.9	4.8
2-28-78	5.1	4.8	4.8
3-01-78	5.2	5.1	4.8
3-02-78	4.8	4.7	4.6
3-03-78	4.6	4.5	4.4
3-04-78	5.1	5.0	4.6
3-05-78	5.0	4.7	4.5
3-06-78	4.5	4.2	4.0
3-07-78	4.3	4.1	4.0
3-08-78	4.8	4.5	4.3
3-09-78	5.2	5.0	4.8
3-10-78	5.2	5.0	5.0
3-11-78	5.5	5.3	5.2
3-12-78	5.6	5.4	5.0
5-13-78	5.0	4.8	4.7
3-14-78	5.0	4.7	4.7
3-15-78	4.7	4.6	4.5
3-16-78	4.9	4.7	4.6
3-17-78	5.2	5.0	4.8
3-18-78	5.4	5.3	5.1
3-19-78	5.6	5.4	5.4
3-20-78	5.6	5.4	5.3
3-21-78	–	–	–
3-29-78	–	–	–
3-30-78	5.6	5.4	5.4
3-31-78	6.0	5.7	5.6
4-01-78	5.9	5.7	5.7
4-02-78	5.8	5.6	5.4
4-03-78	5.4	5.3	5.2
4-04-78	5.6	5.6	5.3
4-05-78	5.4	5.0	5.0
4-06-78	5.7	5.7	5.5
4-07-78	5.8	5.6	5.4
4-08-78	5.5	5.4	5.3
4-09-78	5.5	5.2	5.0
4-10-78	5.1	5.0	4.9
4-11-78	5.4	5.4	5.1
4-12-78	5.5	5.5	5.4
4-13-78	5.6	5.6	5.4
4-14-78	5.5	5.5	5.3
4-15-78	5.7	5.6	5.3

TABLE A-2. (Contd.)

Date	High	Noon	Low
4-16-78	5.3	5.1	4.8
4-17-78	5.0	4.9	4.8
4-18-78	--	--	
4-19-78	5.5	5.4	5.3
4-20-78	5.8	5.7	5.4
4-21-78	5.7	5.4	5.3
4-22-78	5.4	5.2	5.2
4-23-78	5.4	5.3	5.2
4-24-78	--	--	
4-26-78	--	--	
4-27-78	5.5	5.4	5.3
4-28-78	5.7	5.5	5.3
4-29-78	5.8	5.7	5.6
4-30-78	6.0	5.9	5.7
5-01-78	6.0	5.7	5.5
5-02-78	5.9	5.8	5.5
5-03-78	6.1	5.8	5.7
5-04-78	6.2	6.0	5.4
5-05-78	6.1	6.0	5.7
5-06-78	5.7	5.6	5.4
5-07-78	5.5	5.4	5.2
5-08-78	5.6	5.4	5.3
5-09-78	5.9	5.7	5.5
5-10-78	5.8	5.7	5.5
5-11-78	5.6	5.5	5.3
5-12-78	5.5	5.2	5.2
5-13-78	5.9	5.6	5.5
5-14-78	5.9	5.8	5.7
5-15-78	6.1	6.0	5.9
5-16-78	5.8	5.6	5.4
5-17-78	5.7	5.5	5.4
5-18-78	5.7	5.6	5.5
5-19-78	5.8	5.6	5.5
5-20-78	6.0	5.8	5.7
5-21-78	6.1	5.9	5.9
5-22-78	6.3	6.1	6.0
5-23-78	6.2	6.2	5.9
5-24-78	6.1	5.8	5.8
5-25-78	6.0	5.8	5.8
5-26-78	5.8	5.7	5.6
5-27-78	5.6	5.5	5.4
5-28-78	5.7	5.5	5.4
5-29-78	--	--	
6-02-78	--	--	

TABLE A-2. (Contd.)

Date	High	Noon	Low
6-03-78	5.5	5.4	5.3
6-04-78	5.5	5.4	5.3
6-05-78	5.5	5.3	5.3
6-06-78	5.4	5.2	5.1
6-07-78	5.5	5.2	5.1
6-08-78	5.4	5.2	5.2
6-09-78	5.6	5.4	5.3
6-10-78	5.7	5.6	5.5
6-11-78	5.5	5.2	5.2
6-12-78	5.3	5.2	5.1
6-13-78	5.4	5.2	5.1
6-14-78	5.4	5.4	5.3
6-15-78	5.5	5.3	5.2
6-16-78	5.3	5.1	5.1
6-17-78	5.1	4.9	4.9
6-18-78	5.2	5.1	5.0
6-19-78	5.2	5.0	4.9
6-20-78	5.2	5.0	5.0
6-21-78	5.2	5.0	4.9
6-22-78	5.2	5.0	5.0
6-23-78	5.0	5.0	4.9
6-24-78	5.2	5.0	4.9
6-25-78	5.4	5.1	4.9
6-26-78	5.5	5.4	5.3
6-27-78	5.3	5.1	5.1
6-28-78	5.1	5.0	5.0
6-29-78	5.2	4.9	4.9
6-30-78	5.3	5.0	5.0
7-01-78	5.4	5.1	5.1
7-02-78	5.4	5.2	5.2
7-03-78	5.4	5.2	5.2
7-04-78	5.3	5.2	5.1
7-05-78	5.3	5.2	5.2
7-06-78	5.3	5.1	5.1
7-07-78	5.3	5.2	5.1
7-08-78	5.2	5.0	5.0
7-09-78	5.4	5.1	5.1
7-10-78	5.5	5.3	5.2
7-11-78	5.6	5.3	5.3
7-12-78	5.4	5.2	5.2
7-13-78	5.3	5.1	5.1
7-14-78	5.3	5.1	5.1
7-15-78	5.5	5.3	5.2
7-16-78	5.6	5.4	5.4

TABLE A-2. (Contd.)

Date	High	Noon	Low
7-17-78	5.6	5.4	5.4
7-18-78	5.5	5.3	5.3
7-19-78	5.5	5.3	5.2
7-20-78	5.6	5.4	5.3
7-21-78	5.5	5.3	5.2
7-22-78	5.4	5.2	5.2
7-23-78	5.5	5.3	5.2
7-24-78	5.4	5.3	4.9
7-25-78	5.2	5.1	5.0
7-26-78	5.4	5.1	5.0
7-27-78	5.5	5.4	5.3
7-28-78	5.5	5.3	5.3
7-29-78	5.4	5.2	5.2
7-30-78	5.5	5.3	5.3
7-31-78	5.6	5.4	5.4
8-01-78	5.6	5.4	5.3
8-02-78	5.5	5.2	5.2
8-03-78	5.4	5.2	5.2
8-04-78	5.4	5.1	5.0
8-05-78	5.3	5.2	5.0
8-06-78	5.3	5.1	5.0
8-07-78	5.3	5.1	5.0
8-08-78	5.4	5.3	5.2
8-09-78	5.5	5.3	5.2
8-10-78	5.5	5.3	5.1
8-11-78	5.5	5.3	5.3
8-12-78	5.4	5.2	5.1
8-13-78	5.4	5.3	5.2
8-14-78	5.3	5.0	5.0
8-15-78	5.3	5.0	5.0
8-16-78	5.5	5.3	5.2
8-17-78	5.4	5.3	5.1
8-18-78	5.1	4.9	4.8
8-19-78	5.2	5.0	4.9
8-20-78	5.2	4.9	4.8
8-21-78	5.3	5.0	4.9
8-22-78	5.4	5.2	5.1
8-23-78	5.3	5.1	5.0
8-24-78	5.2	4.9	4.9
8-25-78	5.2	4.9	4.9
8-26-78	5.2	5.1	5.0
8-27-78	5.2	5.1	5.0
8-28-78	5.1	5.0	4.8
8-29-78	5.3	5.2	5.0

TABLE A-2. (Contd.)

Date	High	Noon	Low
8-30-78	5.3	5.3	5.1
8-31-78	5.3	5.2	5.0
9-01-78	5.2	5.1	4.8
9-02-78	5.0	5.0	4.8
9-03-78	5.1	5.0	4.8
9-04-78	5.2	5.1	5.0
9-05-78	5.2	5.1	5.0
9-06-78	5.2	5.1	5.0
9-07-78	5.1	5.0	4.9
9-08-78	5.0	4.8	4.7
9-09-78	5.0	4.9	4.8
9-10-78	5.2	5.1	4.9
9-11-78	5.1	4.9	4.7
9-12-78	5.0	4.8	4.7
9-13-78	5.0	4.8	4.6
9-14-78	5.0	4.8	4.6
9-15-78	4.6	4.4	4.3
9-16-78	5.0	4.8	4.5
9-17-78	5.4	5.4	4.9
9-18-78	4.9	4.8	4.4
9-19-78	4.4	4.2	4.2
9-20-78	4.4	4.3	4.2
9-21-78	4.8	4.5	4.4
9-22-78	4.6	4.4	4.4
9-23-78	4.6	4.4	4.2
9-24-78	4.7	4.5	4.4
9-25-78	4.8	4.6	4.5
9-26-78	4.8	4.6	4.6
9-27-78	4.8	4.6	4.5
9-28-78	4.8	4.6	4.5
9-29-78	4.8	4.6	4.5
9-30-78	4.8	4.6	4.5
10-01-78	4.8	4.6	4.6
10-02-78	4.8	4.6	4.6
10-03-78	4.9	4.7	4.6
10-04-78	4.8	4.7	4.6
10-05-78	4.8	4.6	4.5
10-06-78	4.7	4.5	4.4
10-07-78	4.8	4.6	4.5
10-08-78	4.7	4.6	4.5
10-09-78	4.6	4.5	4.4
10-10-78	4.5	4.3	4.2
10-11-78	4.8	4.5	4.4
10-12-78	4.8	4.6	4.6

TABLE A-2. (Contd.)

Date	High	Noon	Low
10-13-78	4.6	4.4	4.3
10-14-78	4.5	4.3	4.2
10-15-78	4.8	4.5	4.4
10-16-78	5.0	4.9	4.8
10-17-78	4.9	4.7	4.5
10-18-78	4.6	4.4	4.4
10-19-78	4.6	4.4	4.4
10-20-78	4.7	4.5	4.4
10-21-78	5.0	4.9	4.7
10-22-78	4.7	4.4	4.3
10-23-78	4.6	4.4	4.3
10-24-78	—	—	—
10-26-78	—	—	—
10-27-78	4.5	4.4	4.3
10-28-78	4.6	4.4	4.3
10-29-78	4.9	4.8	4.6
10-30-78	4.9	4.8	4.4
10-31-78	4.4	4.2	4.0
11-01-78	4.4	4.3	4.2
11-02-78	4.4	4.3	4.1
11-03-78	4.2	4.1	3.9
11-04-78	4.7	4.5	4.2
11-05-78	4.7	4.6	4.3
11-06-78	4.3	4.2	4.0
11-07-78	4.3	4.2	4.0
11-08-78	4.8	4.6	4.3
11-09-78	5.4	5.3	4.8
11-10-78	5.4	5.3	5.1
11-11-78	5.2	5.1	4.7
11-12-78	4.7	4.6	4.3
11-13-78	4.6	4.5	4.4
11-14-78	4.4	4.4	4.2
11-15-78	4.2	4.1	3.9
11-16-78	4.2	4.1	3.9
11-17-78	4.3	4.2	4.1
11-18-78	4.4	4.3	4.1
11-19-78	4.7	4.6	4.4
11-20-78	4.8	4.7	4.6
11-21-78	5.0	4.9	4.7
11-22-78	4.7	4.5	4.3
11-23-78	4.5	4.4	4.2
11-24-78	5.0	4.9	4.5
11-25-78	4.7	4.6	4.5
11-26-78	4.5	4.5	4.3

TABLE A-2. (Contd.)

Date	High	Noon	Low
11-27-78	4.3	4.1	3.9
11-28-78	4.2	4.2	3.9
11-29-78	4.4	4.4	4.1
11-30-78	4.9	4.4	4.1
12-01-78	5.4	5.4	4.9
12-02-78	5.0	4.6	4.2
12-03-78	4.2	4.1	3.8
12-04-78	4.9	4.3	3.8
12-05-78	5.2	5.2	4.8
12-06-78	5.0	5.0	4.3
12-07-78	--	--	--
12-10-78	--	--	--
12-11-78	4.4	4.3	4.1
12-12-78	4.4	4.4	4.2
12-13-78	4.3	4.2	4.1
12-14-78		--	--
12-28-78	--	--	--
12-29-78	4.7	4.6	4.5
12-30-78	4.4	4.3	3.9
12-31-78	3.9	3.6	3.4
1-01-79	4.3	4.2	3.8
1-02-79	4.3	4.2	4.1
1-03-79	4.6	4.5	4.3
1-04-79	4.7	4.4	4.3
1-05-79	4.9	4.8	4.6
1-06-79	4.9	4.7	4.5
1-07-79	4.6	4.4	4.3
1-08-79	4.6	4.3	4.2
1-09-79	4.7	4.5	4.2
1-10-79	4.7	4.5	4.1
1-11-79	--	--	--
1-17-79	--	--	--
1-18-79	4.7	4.7	4.5
1-19-79	4.4	4.2	3.9
1-20-79	4.3	4.0	3.9
1-21-79	4.9	4.7	4.3
1-22-79	5.0	4.7	4.5
1-23-79	4.9	4.6	4.4
1-24-79	5.5	5.2	4.8
1-25-79	5.5	5.3	4.6
1-26-79	4.6	4.2	4.0
1-27-79	4.8	4.6	4.0
1-28-79	4.9	4.8	4.2
2-01-79		--	--

TABLE A-2. (Contd.)

Date	High	Noon	Low
2-02-79	–	–	–
2-03-79	4.0	3.8	3.7
2-04-79	4.2	4.1	3.1
2-05-79	4.3	4.2	4.0
2-06-79	4.3	4.1	4.0
2-07-79	4.3	4.3	4.2
2-08-79	4.2	4.0	3.9
2-09-79	4.3	4.2	4.1
2-10-79	4.5	4.4	4.3
2-11-79	4.6	4.5	4.4
2-12-79	–	–	–
2-18-79	–	–	–
2-19-79	5.5	5.5	5.3
2-20-79	5.7	5.5	5.3
2-21-79	5.9	5.8	5.6
2-22-79	5.6	5.5	5.4
2-23-79	5.5	5.3	4.9
2-24-79	4.9	4.7	4.6
2-25-79	5.4	5.1	4.8
2-26-79	5.7	5.6	5.2
2-27-79	5.4	5.2	5.0
2-28-79	6.1	5.7	5.4
3-01-79	6.1	6.0	5.5
3-02-79	5.5	5.1	5.0
3-03-79	–	–	–
3-06-79	–	–	–
3-07-79	5.4	5.1	4.9
3-08-79	5.6	5.5	5.4
3-09-79	5.6	5.4	5.2
3-10-79	5.2	4.9	4.8
3-11-79	5.2	5.0	4.9
3-12-79	5.5	5.3	5.2
3-13-79	5.3	5.2	5.1
3-14-79	5.1	5.0	4.9
3-15-79	5.7	5.4	5.1
3-16-79	5.7	5.7	5.6
3-17-79	5.7	5.5	5.4
3-18-79	5.8	5.6	5.4
3-19-79	5.9	5.8	5.8
3-20-79	–		–
4-02-79	–	–	–
4-03-79	5.8	5.7	5.6
4-04-79	5.9	5.7	5.6
4-05-79	6.2	6.0	5.8

TABLE A-2. (Contd.)

Date	High	Noon	Low
4-06-79	6.3	6.3	6.1
4-07-79	6.2	6.0	5.9
4-08-79	6.3	6.1	6.0
4-09-79	6.6	6.5	6.3
4-10-79	6.4	6.3	6.3
4-11-79	6.4	6.3	6.0
4-12-79	6.0	5.8	5.7
4-13-79	6.2	6.0	5.9
4-14-79	6.2	6.1	6.0
4-15-79	6.3	6.1	6.0
4-16-79	6.5	6.3	6.2
4-17-79	6.5	6.4	6.3
4-18-79	6.3	6.1	6.0
4-19-79	6.0	5.9	5.8
4-20-79	6.1	6.0	5.9
4-21-79	6.3	6.2	6.1
4-22-79	6.4	6.3	6.2
4-23-79	6.4	6.3	6.2
4-24-79	6.3	6.2	6.1
4-25-79	6.2	6.0	6.0
4-26-79	6.3	6.2	6.1
4-27-79	6.2	6.1	6.0
4-28-79	6.3	6.2	6.1
4-29-79	6.4	6.3	6.2
4-30-79	6.6	6.4	6.3
5-01-79	6.7	6.6	6.4
5-02-79	6.4	6.3	6.1
5-03-79	--	--	--
5-04-79		--	--
5-05-79	6.5	6.4	6.3
5-06-79	6.7	6.5	6.5
5-07-79	6.6	6.5	6.4
5-08-79	6.5	6.4	6.3
5-09-79	6.3	6.1	5.9
5-10-79	--	--	--
5-12-79	--	--	--
5-13-79	6.2	6.1	6.0
5-14-79	6.3	6.1	6.0
5-15-79	6.3	6.2	6.1
5-16-79	6.3	6.2	6.1
5-17-79	6.2	6.0	6.0
5-18-79	6.2	6.1	6.0
5-19-79	6.4	6.2	6.1
5-20-79	6.3	6.1	6.1

TABLE A-2. (Contd.)

Date	High	Noon	Low
5-21-79	6.1	5.9	5.8
5-22-79	6.1	5.9	5.8
5-23-79	6.1	6.0	5.9
5-24-79	6.2	6.1	6.0
5-25-79	6.1	5.9	5.9
5-26-79	6.3	6.1	6.0
5-27-79	6.4	6.2	6.1
5-28-79	6.3	6.1	6.1
5-29-79	6.2	5.9	5.9
5-30-79	6.1	6.0	5.9
5.31-79	6.0	5.8	5.8
6-01-79	6.0	5.8	5.8
6-02-79	6.0	5.9	5.8
6-03-79	6.1	6.0	5.9
6-04-79	--	--	--
6-05-79	--	--	--
6-06-79	6.5	6.3	6.1
6-07-79	6.3	6.1	5.8
6-08-79	5.8	5.7	5.6
6-09-79	5.6	5.5	5.4
6-10-79	5.8	5.5	5.5
6-11-79	5.8	5.6	5.5
6-12-79	5.8	5.7	5.6
6-13-79	5.8	5.7	5.7
6-14-79	6.0	5.8	5.8
6-15-79	6.0	5.7	5.7
6-16-79	6.2	6.0	5.9
6-17-79	6.1	5.9	5.7
6-18-79	5.7	5.5	5.4
6-19-79	5.5	5.3	5.2
6-20-79	5.6	5.4	5.3
6-21-79	5.6	5.3	5.3
6-22-79	5.6	5.4	5.4
6-23-79	5.6	5.4	5.4
6-24-79	5.6	5.4	5.4
6-25-79	5.5	5.3	5.2
6-26-79	5.6	5.3	5.2
6-27-79	--	--	--
7-07-79	--	--	--
7-08-79	5.4	5.2	5.2
7-09-79	--	--	--
7-16-79	--	--	--
7-17-79	5.4	5.2	5.1
7-18-79	5.6	5.4	5.3

TABLE A-2. (Contd.)

Date	High	Noon	Low
7-19-79	5.7	5.6	5.4
7-20-79	5.5	5.5	5.4
7-21-79	--	--	--
7-22-79	--	--	--
7-23-79	5.7	5.5	5.4
7-24-79	5.7	5.5	5.5
7-25-79	--	--	--
7-31-79	--	--	--
8-01-79	5.8	5.5	5.8
8-02-79	6.0	5.7	5.7
8-03-79	6.0	5.8	5.8
8-04-79	--	--	--
8-05-79	--	--	--
8-06-79	5.8	5.6	5.6
8-07-79	5.9	5.6	5.6
8-08-79	--	--	--
8-11-79	--	--	--
8-12-79	5.9	5.7	5.7
8-13-79	6.0	5.7	5.7
8-14-79	5.9	5.7	5.7
8-15-79	5.8	5.6	5.6
8-16-79	5.9	5.7	5.7
8-17-79	--	--	--
8-19-79	--	--	--
8-20-79	6.1	6.0	5.9
8-21-79	6.1	6.0	5.9
8-22-79	6.4	6.1	5.9
8-23-79	6.5	6.3	6.2
8-24-79	6.6	6.5	6.4
8-25-79	6.7	6.6	6.5
8-26-79	6.7	6.6	6.5
8-27-79	6.7	6.6	6.4
8-28-79	6.8	6.7	6.6
8-29-79	6.7	6.7	6.6
8-30-79	6.6	6.6	6.4
8-31-79	6.6	6.5	6.4
9-01-79	6.6	6.6	6.4
9-02-79	6.4	6.4	6.2
9-03-79	--	--	--
9-04-79	6.5	6.3	6.3
9-05-79	6.3	6.1	6.1
9-06-79	6.2	6.1	6.0
9-07-79	6.3	6.2	6.1
9-08-79	6.3	6.3	6.1

TABLE A-2. (Contd.)

Date	High	Noon	Low
9-09-79	6.3	6.3	6.2
9-10-79	6.3	6.2	6.2
9-11-79	6.3	6.2	6.1
9-12-79	6.1	6.1	5.9
9-13-79	6.2	6.0	6.0
9-14-79	6.1	5.9	5.9
9-15-79	6.0	5.8	5.8
9-16-79	6.1	5.8	5.8
9-17-79	6.1	6.0	6.0
9-18-79	6.1	5.9	5.9
9-19-79	6.3	6.0	6.0
9-20-79	6.3	6.1	6.1
9-21-79	6.2	6.1	6.1
9-22-79	6.1	6.0	6.0
9-23-79	6.1	5.9	5.9
9-24-79	6.1	5.9	5.9
9-25-79	6.1	5.9	5.8
9-26-79	6.1	6.0	5.9
9-27-79	6.2	6.1	6.0
9-28-79	6.1	6.0	5.9
9-29-79	6.0	5.8	5.8
9-30-79	6.1	6.0	5.9
10-01-79	6.0	6.0	5.9
10-02-79	6.0	6.0	5.9
10-03-79	6.0	6.0	5.8
10-04-79	6.0	6.0	5.8
10-05-79	6.1	6.0	5.8
10-06-79	6.3	6.2	6.0
10-07-79	6.4	6.4	6.2
10-08-79	6.1	6.0	5.9
10-09-79	6.0	6.0	5.9
10-10-79	6.0	5.8	5.7
10-11-79	6.3	6.1	6.0
10-12-79	6.3	6.2	6.2
10-13-79	6.4	6.3	6.3
10-14-79	6.2	6.0	6.0
10-15-79	6.1	5.9	5.9
10-16-79	6.2	6.1	5.8
10-17-79	6.4	6.4	6.1
10-18-79	6.5	6.4	6.2
10-19-79	6.6	6.1	5.9
10-20-79	6.6	6.5	6.1
10-21-79	6.2	5.9	5.7
10-22-79	5.8	5.6	5.6

TABLE A-2. (Contd.)

Date	High	Noon	Low
10-23-79	6.0	5.9	5.8
10-24-79	6.2	6.1	5.9
10-25-79	6.2	6.2	6.0
10-26-79	6.5	6.0	5.8
10-27-79	6.2	6.0	5.8
10-28-79	6.4	6.3	6.1
10-29-79	6.2	6.0	5.8
10-30-79	-	-	-
10-31-79	6.2		6.0
11-01-79	6.0	6.0	5.8
11-02-79	6.0	5.9	5.7
11-03-79	6.4	6.3	6.1
11-04-79	6.0	5.9	5.9
11-05-79	5.8	5.7	5.6
11-06-79	6.1	5.9	5.8
11-07-79	6.4	6.3	6.1
11-08-79	6.4	6.2	6.1
11-09-79	6.1	6.1	6.0
11-10-79	5.9	5.8	5.7
11-11-79	5.8	5.7	5.4
11-12-79	5.7	5.6	5.5
11-13-79	5.8	5.7	5.5
11-14-79	5.9	5.9	5.6
11-15-79	5.8	5.7	5.6
11-16-79	6.2	5.9	5.7
11-17-79	6.4	6.3	6.2
11-18-79	6.2	5.9	5.8
11-19-79	5.8	5.6	5.4
11-20-79	5.8	5.7	5.4
11-21-79	-	--	--
11-30-79	-	--	--
12-01-79	5.8	5.8	5.4
12-02-79	6.0	5.5	5.4
12-03-79	-	--	--
12-15-79	-	--	-
12-16-79	7.2	7.0	6.9
12-17-79	7.4	7.3	7.1
12-18-79	7.3	7.1	7.0
12-19-79	7.6	7.5	7.2
12-20-79	-	-	--
12-30-79	-	-	--
12-31-79	7.4	7.3	7.3

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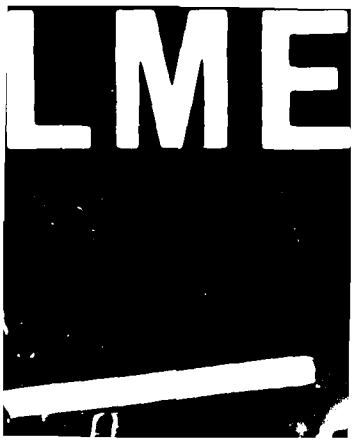
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